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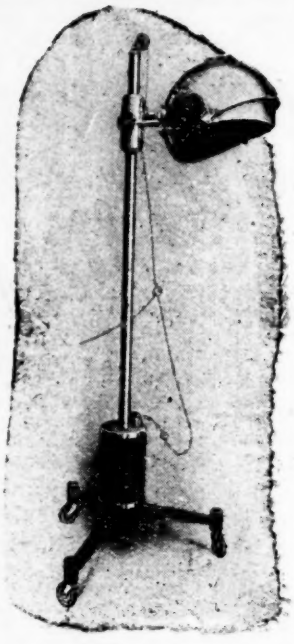

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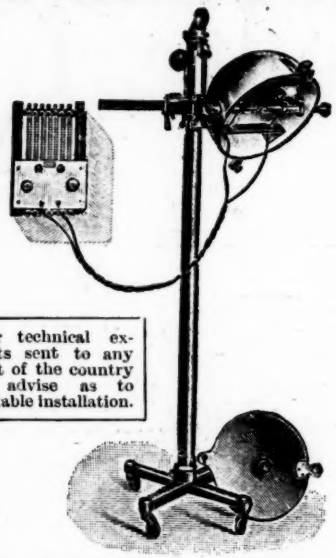

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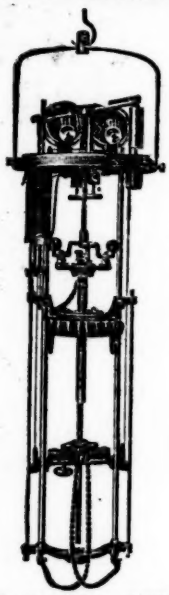

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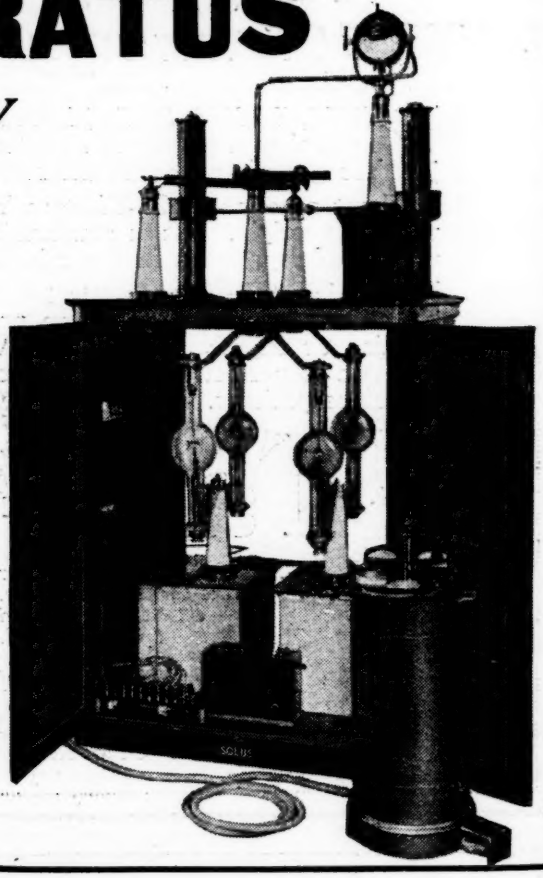

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A Review
OF
THE PRESENT POSITION OF KNOWLEDGE
AS TO
PROSTATIC ENLARGEMENT.

Being the Bradshaw Lecture delivered on November 10th, 1927, to the Royal College of Surgeons of England,

BY

SIR CUTHBERT WALLACE, K.C.M.G., C.B., F.R.C.S.,
SURGEON TO ST. THOMAS'S HOSPITAL.*

FUNCTION AND FORM.

RECENT years have added little to our knowledge of the function of the prostate. It is not apparent that it has any internal secretion, or that it exercises any influence on metabolism; it is a secondary sexual gland.

The glands that make up the prostate spring apparently from all sides of the urethra, but the anterior group ultimately atrophy. The gland mass that lies below the ejaculatory ducts is seldom the seat of changes and usually retains its spongy nature.

Long before birth the prostate has assumed its adult form and the gland tubules the distribution that pertains throughout life. There is no indication of any division into lobes or lobules. The tubules run out from the side or posterior walls of the urethra, tending to bend forward as the distance from the urethra increases. In front there is very little if any gland matter. This glandless area represents an atrophy of tubules, not a fusion of constituent lobules. None of the tubules of the gland reach the surface, thus leaving another non-glandular portion. Lastly, there is always a considerable thickness of non-glandular tissue surrounding the urethral canal.

HISTORICAL.

[The history of prostatectomy was then reviewed, beginning with the early work of McGill of Leeds (1887).]

From 1886 until the close of the century the operative treatment of enlarged prostate was undergoing a slow and painful evolution. In 1888 Harrison of Liverpool was advocating perineal section and prostatotomy, more especially in those cases of foul urine and degenerated kidneys, and in this way seems to have laid the foundation of the present two-stage operation; but the general feeling of the profession can be gauged by the eagerness with which the so-called sexual operations were taken up. In the late nineties the operation of prostatectomy was again making headway, and the sexual operations, having been found wanting, were declining. In 1900, while the treatment of enlarged prostate was still chaotic, Freyer published his series of successful cases, which, anyhow in this country, re-established prostatectomy as an operation of choice.

Since this time the suprapubic operation has found favour with most surgeons, and the technique of its performance has remained in the main unaltered. The perineal operation has, however, found some formidable advocates, and appears at the present time to be gaining ground.

THE SEXUAL OPERATIONS.

In 1775 John Hunter made the classical observation on the want of development of the prostate that resulted from castration in youth or infancy. Castration as a remedy for prostatic enlargement was suggested to White of Philadelphia by the shrinking of uterine fibroids after ovariotomy, the uterus being considered a homologue of the prostate. It was found by experiment that castration of adult dogs was quickly followed by atrophy of the prostate. In 1889 Griffiths had reported to the same effect.

Treatment by castration, although put forward academically, was taken up with a rush, and, like many new treatments, was at first apparently efficacious. Even unilateral orchidectomy was reported to be efficient. The literature of the period, however, shows that castration could not be relied upon to cause an atrophy of the enlarged prostate.

Vasectomy was next proposed as a slighter operation, but one warranted to produce the same effect. It had a vogue, but gradually it also lost favour, and with it the sexual operations ended. Mr. Shattock and I did some experiments to test this matter; we found that, while cutting off the blood supply caused an atrophy of the testicle, division of the duct left the testicle entirely intact. While in the midst of these experiments we discovered that John Hunter had made the observation in the human subject that the testicle developed and contained spermatozoa although there was no connexion between the testicle and its excretory canal. In vasectomy, as practised for the relief of prostatic enlargement, we have an example of how careful one must be to verify the facts before applying them.

CAUSATION AND NATURE OF THE ENLARGEMENT.

Two theories as to the nature of prostatic enlargement have alternately held the premier place—the infective and neoplastic. Nothing of interest in this connexion has come to light of recent years, except that Hugh Young, by a careful statistical inquiry, has shown that gonorrhoea, at all events, plays no part in the etiology. At present most people regard the enlargement as due to the growth of adenomata, and if this is accepted, the cause of prostatic enlargement is the same as that of other such growths. In this association it may be useful briefly to allude to certain facts:

1. The growths reproduce fairly faithfully the histological features of the parent, both as regards stroma and gland tissue.
2. Encapsulation is usually very complete, especially in old-standing cases.
3. Sometimes, however, the encapsulation is incomplete and recalls certain adenomata of the breast.
4. The growths are often compound, one adenoma comprising several small ones.
5. The time of appearance is late in life, and this may have some connexion with the proneness of the growths to become carcinomatous.

POINT OF ORIGIN OF THE ADENOMATA.

There is still some difference of opinion as to the exact place in the gland at which these masses arise. One school maintains that they are not true prostatic tumours, but arise in the subcervical glands or in those of Albarran, both of which are submucous; in far the greater number of cases, however, the point of origin lies well within the prostate proper. The adenomatous masses usually arise in connexion with the acini which enter the prostatic urethra above the mouths of the ejaculatory ducts; that portion of the gland which lies below seems little prone to this change and often retains its normal spongy texture after the rest has undergone a complete change.

CAUSATION OF SYMPTOMS.

The symptoms, which must be of local origin, since bladder function returns practically to normal when the obstruction has been removed, may now be discussed.

Frequent and precipitate micturition may be explained by thinning and then replacement of the contractile tissue about the internal meatus by the adenomatous growth.

Hesitant and interrupted micturition are more difficult of explanation. Hitherto they have been put down to the ball-valve action of the "third lobe." Now a growth behind the urethra that could act in this way is a rarity, and I would suggest that these symptoms are caused somewhat in the following way. The urethra is surrounded by an adenomatous mass which is under tension caused by its growth stretching the pathological capsule. The urethra is also bent at an angle so that it forms a kind of flap valve. For urine to pass, the pressure in the bladder has to be so adjusted that it can overcome the increased pressure within the urethra and at the same time be insufficient to shut the valve. Any departure from the

* The report has been slightly abridged by the omission of some introductory matter.

optimum bladder pressure will cause a cessation of the flow of urine. The distressing symptom of dribbling from the urethra after the act of micturition should have been finished may be accounted for by the elongation, stretching, and distortion of the canal by the adenomata which have replaced the normal contractile tissue or hindered its orderly action.

Residual urine is the most difficult symptom to explain—in fact, it never has been explained. The most ingenious solution is that which attributes it to the intravesical pressure on the varying cone-like projection of the prostate into the bladder. When the bladder is full the cone will project but little, but as the organ empties the cone will offer a greater surface that is subject to pressure, with the result that the urethra becomes occluded. Unfortunately for this explanation a vesical cone is not always present.

I would suggest that residual urine is really a case of bladder posture. Fullness of the bladder is a relative term. The usual act of micturition, when once the initial stimulus of distension has been given, is continuous. The bladder during the process of emptying will contain from time to time an amount of urine which in process of filling had produced no desire for micturition. If the act of emptying is slow or interrupted, as it is in prostatic trouble, it is possible to imagine that the impulse necessary to carry the act to completion becomes dormant or fails to be again initiated; to speak in homely terms, the bladder imagines itself to be empty.

The Fate of the Cavity left by Operation.

Even before the revival of prostatectomy it was asserted that the procedure consisted in the total removal of the prostate. This was given as an explanation of the success of the operation. It is, however, now, I think, generally admitted that the modern operation for prostatic hypertrophy consists in enucleation of adenomatous masses from within the expanded outer portion of the organ, and that there is no real solution of continuity between the bladder and the urethra. That fact accounts in part for the almost unbelievable fact that the operation is very seldom followed by stricture.

After the enucleation the urethra and bladder are joined by a ragged cavity, which may be at that moment of very considerable dimensions. Very soon after the removal of the adenomata, or rather at the very moment of their removal, the cavity contracts centripetally, so that not only are the sides of the cavity approximated, but the bladder is at the same time approximated to the urethra. This contraction is brought about by the resilience of the remaining part of the prostate, and it may be remembered that it is this resilience pressing on the central adenomatous mass which is in part the cause of the urinary difficulties. This contraction at the time of operation is a very real thing, and gives rise to considerable difficulty if the surgeon wishes visually to explore the cavity. After the operation the cavity continues to retract, so that in some cases within a few weeks a skiagram of the bladder shows no sign of its existence. Sometimes, however, a distinct cavity remains for a considerable period, though micturition is perfectly normal. It might be argued that the existence of this cavity shows that the internal sphincter is out of action. There is, however, another explanation: it is possible that, in those cases in which a cavity persists, the growth has been largely intravesical, and that the top of the cavity corresponds, not to the internal sphincter, but to the level to which the mucous membrane of the bladder has been raised.

When an opportunity occurs of inspecting and digitally examining a bladder after prostatectomy, it is remarkable how little abnormality is to be made out; perhaps there is a small dimple at the internal meatus, or the meatus is not so dilatable as it normally is, and reminds one of the state of affairs in carcinoma or in the so-called "Mercier's bar." Again, it is almost impossible to be sure by rectal examination whether the prostate has been removed or not.

The two-stage operation was introduced quite early in the history of prostatectomy to rest the patient who was worn down by sepsis and want of sleep. The indications for its performance were at first almost entirely clinical. The discovery and perfection of tests of urinary efficiency have extended and rendered more accurate the indications for the performance of this operation.

It entails, however, certain disadvantages. The first is that there are two anaesthetic administrations and two periods of anxiety and discomfort. The second is that the enucleation is made more difficult by the shrinking of the bladder, the hardening and contraction of the prostate, and the induration of the abdominal wall. In addition, the wound may become foul and phosphatic deposit give trouble.

If the two-stage operation is decided upon, the relative merits of catheter and suprapubic drainage are to be considered. The catheter has been with many surgeons very successful; it avoids two operations, but it may give rise to a urethritis which is troublesome, and in some cases to a definite rise in the blood urea. Suprapubic cystostomy has the great advantage that the condition of the prostate can be accurately determined by the only certain way—namely, that of bimanual examination.

I have nothing to say about after-treatment, except to express the opinion that, whatever is the means favoured to carry off the urine after prostatectomy, the less the prostatic couch is interfered with the better. I have been very free from secondary haemorrhage, and I attribute this to only washing the bladder out in exceptional circumstances.

Urinary Efficiency.

There are, of course, discrepancies between the various tests or parts of the same test, but in the main a fairly just estimate as to the efficiency of the kidneys can be formed.

Mention must here be made of what is, to me at all events, a difficult problem. When is the surgeon justified in refusing to proceed to a second stage prostatectomy? There are a certain number of patients on whom a drainage cystostomy has been performed, and whose urinary efficiency, as judged by the usual tests, has never fallen to a figure that would, in the first instance, have warranted a single stage prostatectomy, although in other ways they seem to be in good health.

The question to be decided is this: What percentage of urinary efficiency is to be taken as justifying completion of the operation after a period of drainage?

The mechanism whereby the loss of efficiency of the kidney is brought about is still unsolved. It is doubtful what effect the obstruction to outflow has on the constituents of the urine and what is the ultimate fate of a kidney whose duct has been completely occluded for varying periods.

The rapid improvement that takes place in some cases after drainage of the bladder is mysterious. Perhaps the easiest explanation is that which attributes recoverable damage to vascular compression and not to histological change.

Back Pressure.

It is usual to attribute the troubles of the kidney simply to "back pressure," but when the subject is examined more carefully it is not so easy to understand how the kidney is subjected to an obstruction lasting over a long period. It is not very obvious why we speak of back pressure in connexion with the kidney and do not use the term when we talk of obstruction in connexion with other ducts and the intestinal tube. It is an unfortunate expression, because it sometimes leads to the belief that the pressure which injures the kidney originates in the bladder as the result of tension or of muscular contraction.

The pressure that dilates the ureter and destroys the kidney is the secretion pressure of the kidney, and it may be of interest to consider what are the pressures in the bladder that hinder the ureter in propelling the urine into the bladder; so long as the ureter can get rid of the urine, the kidney will be shielded from any noxious pressure.

I am indebted to Mr. B. W. Williams for the observations incorporated in Table I. They show the pressure in the bladder of some cases of retention. They were taken by means of a water gauge and have been reduced to milli-

metres of mercury, as more readily appreciable. The pressures recorded are those found in the intervals between spasms of the bladder.

TABLE I.—*Pressure in Bladder in Cases of Retention.*

Case No.	Duration of Retention.	Bladder Pressure in mm. Mercury.	Amount of Urine.	Case No.	Duration of Retention.	Bladder Pressure in mm. Mercury.	Amount of Urine.
1	36 hrs.	8-10	35 oz.	6	12 hrs.	34	46 oz.
2	7 days	22-25	85 oz.	7	24 hrs.	27	50 oz.
3	48 hrs.	22-23	45 oz.	8	24 hrs.	16	50 oz.
4	overflow	19	20 oz.	9	22 hrs.	8-10	36 oz.
5	3 days	29	42 oz.	10	24 hrs.	24	40 oz.

It will be seen that the maximum pressure which the ureter has to overcome in a case of acute retention of urine is about 34 mm. of mercury. The pain occasioned at such a pressure is not to be endured; the individual is compelled to seek relief. From this it appears that any high pressure that may act injuriously on the kidney must be of very short duration.

In most patients, even in those with a considerable amount of residual urine, the pressure against which the ureter has to work must be very slight. In fact, it is difficult to see that the pressure in the bladder in most cases of residual urine can be greater than that which pertains in the ordinary course of filling of the bladder. It follows that there are three possibilities, which are: (1) that the kidney is extremely sensitive to any obstruction, or (2) that the damage done is in the nature of a sudden catastrophe (during an attack of retention), or (3) that we must seek some unknown cause of kidney deterioration.

THE SUPRAPUBIC AND PERINEAL OPERATIONS COMPARED.

While the suprapubic method of operating has been chosen by the great majority of surgeons, the perineal has been practised by surgeons of great repute and experience, one of whom has probably the lowest mortality of anyone. It is therefore useful to inquire whether there is any reason for the majority to change their methods. It is claimed that (1) the perineal is the more scientific, in that the enucleation is more deliberate and is performed under the eye; (2) the ejaculatory ducts can be saved, or ligated; (3) the urethral wall can be left intact; and (4) the loss of blood is less.

To take these points one by one.

1. Some surgeons might say that by using a large vesical incision the enucleation can be carried out as openly and as deliberately by the suprapubic as by the perineal route. Putting this contention aside for the moment, it may be considered whether the enucleation under the eye is a material advantage. Removal of the adenomata is not a matter of delicate and difficult dissection, but really consists in entering a line of cleavage already established and following it to its end. It therefore matters little whether this is done under the eye or not. An accurate judgement that all adenomata have been removed can be formed by bimanual examination when the suprapubic route has been used.

2. As regards the preservation of the ejaculatory ducts, if it could be shown that children had been born to patients who had undergone perineal prostatectomy, it would be a point in favour of that operation, as a restoration *ad integram* is always desirable. I am unaware, however, that a man has ever begotten a child after a prostatectomy. As regards a man's virility, apart from power of procreation, we have already seen that section of the vas produces no effect. It is not very clear whether the occurrence of epididymitis is caused or prevented by rupture of the vas. If opening the canal can cause an infection to spread to the epididymis, it cannot be denied that infection can occur with an intact vas or one in which the lumen has been obliterated by ligature after rupture. In the matter of the vasa, therefore, it does not seem that the perineal method has any advantage over the suprapubic operation.

3. My observations on many *post-mortem* and operative specimens have led me to doubt the possibility of leaving the urethral wall intact in any but a very small and insignificant number of cases, and I should not be influenced on this account in the choice of the operative route.

4. If excessive bleeding could be certainly and effectively diminished by the perineal route, that would be a very good argument in favour of its adoption.

5. As regards restoration of function, and absence of a persistent operative sinus, the suprapubic method leaves little to be desired.

Professor Hans Wildbolz, in a recent communication, has advocated the use of the perineal method and the suture of the neck of the bladder and the distal portion of the prostatic urethra. He also states that the mortality of the operation is less than that of the suprapubic method, that the former method leads to a smaller rise in the blood urea, that sepsis is practically abolished, and that union takes place *per primam*. If other surgeons can reach the same results it will be a great argument in favour of the perineal method.

BEST TIME FOR OPERATION.

It is fortunate that, although the adenomata may be multiple, they are usually all of an age, so that when they have necessitated operation their removal is not followed by the formation of others. It should be the aim of the surgeon to remove the obstruction before the urinary function is depressed.

If the prostate is large and resilient and the life of the patient is disturbed by his trouble, the decision to operate presents no difficulties. On the other hand, if the prostate presents no great departure from the normal and the patient is willing to put up with what discomfort he has, most surgeons would, I think, be willing to wait, provided the kidneys are efficient and the patient can be watched.

More difficult are those cases in which the life of the patient is being somewhat disturbed by urinary troubles and examination by the rectum reveals a prostate perhaps a little large but not much altered in shape or size. Such a case may prove to be one of simple prostate which has not greatly enlarged or not enlarged toward the rectum, a case of carcinoma, or "prostatic bar." I know of no sure way in which the matter can be settled except by opening the bladder and bimanual palpation.

It has been truly said that if an individual is destined to have trouble with his prostate, he is lucky if the organ, so to speak, ripens quickly about the age of 60. The kidneys will most probably be in good condition, a single-stage operation is possible, and there is a prospect of many years of health and enjoyment of life.

CARCINOMA.

Hitherto the treatment of carcinoma has not been satisfactory, either from the operative or radiation point of view.

Operative treatment involves the entire removal of the gland. This is a difficult and tedious procedure. It has been accomplished, however, in a limited number of cases by the perineal and by the transpubic routes, and the feasibility of a satisfactory union of the bladder and urethra demonstrated. If the mechanical difficulties of removal have been got over, it cannot be said that the difficulties of diagnosis sufficiently early to justify a serious operation, and offer a reasonable prospect of cure, have been surmounted. Herein, to my mind, lies the crux of the question. The diagnosis of carcinoma is usually made on the hardness, the nodularity, the fixation of the prostate as felt per rectum, and the inelasticity of the internal meatus as felt from the bladder. By the time that the signs of malignant disease are irrefutable, as judged by a rectal or cystoscopic examination, the time of successful intervention is probably past. The rigidity of the internal meatus, which is a useful sign, can only be ascertained after a suprapubic cystostomy; this is a distinct advantage if the prostate is to be excised by the perineal route.

Again, there is the difficulty of diagnosing carcinoma from that undifferentiated group of affections that may be classed under the term "post-urethral bar."

Adeno-carcinoma in its own way presents almost as great a difficulty. This condition may be diagnosed in the process of enucleation of a presumed adenomatous mass, or it may not be diagnosed until after a microscopical examination.

Here the surgeon has three courses open to him: (1) He can proceed forthwith to total extirpation of the prostate, removal of which will have been made all the more difficult by the already accomplished operation. (2) He can wait and put the matter before his patient. (3) He can allow the bladder to close, if it will, and establish a suprapubic drain when obstruction supervenes, which usually happens within six months.

Radiation.

Radiation has been carried out from the urethra, from the rectum, and by means of needles introduced through the perineum or through the bladder; deep therapy has also been used.

Radiation in carcinoma of the prostate is in the same condition as radiation for carcinoma in other parts of the body. We are slowly and painfully groping our way towards a better knowledge. There are many groups of observers doing good and careful work throughout the country, but I cannot help wishing that someone who has the means would by his generosity render possible a more intensive study of the subject.

Professor Sidney Russ of the Middlesex Hospital has kindly prepared for me the accompanying table of the radium publicly owned in the countries named. The figures for the British Isles include the radium held by the London, Manchester, and Glasgow institutes.

Table II.—*Estimates of Radium Publicly Owned (1927) for Medical Purposes.*

Country.	Population (Millions).	Grams of Radium.	Grams per Million.
Australia	6.2	10	1.60
Denmark	3.3	2	0.59
Belgium	7.5	4	0.53
France	40	18	0.45
British Isles	45	11.5	0.25
Sweden	5.5	1	0.18
Germany	56	2	0.04

Mortality.

It is extremely difficult to arrive at a just estimate of the mortality of any operative measure. It is almost always better in private practice than in hospital, owing to the different social classes from which the patients are taken.

I may give, in the first place, a few instances of figures given by individuals. In 1893 White of Philadelphia gave the mortality of the perineal route as between 13 and 14 per cent., and that of the suprapubic as 20 to 25 per cent. In 1912 Freyer gave the mortality in 1,000 cases as 5½ per cent., and stated that in the last 100 cases it had fallen to 3 per cent. Hey Groves, commenting on these figures, said that he had taken the mortality for all the available large hospitals in the kingdom and found it to be 40 per cent. Hugh Lett in 1913 said he believed that the mortality of hospital patients was 20 per cent. Fullerton stated in the same year that his mortality in 55 cases was 7.2 per cent.

Hugh Young, in his *Practice of Urology* (1927), gives his mortality for the perineal operation as 3.4 per cent. in 1,049 cases, and Wildbolz just recently has stated that his mortality for the suprapubic method (105 cases) is 15 per cent., and for the perineal operation (305 cases) is 6.5 per cent. These figures show very real differences.

Through the courtesy of some surgeons I am able to show some figures from different London hospitals, which are a good guide, as showing the results in one class of patients.

Table III.—*Statistics of Prostatic Enlargement and Prostatectomy from Four London Hospitals.*

(The figures are the last available.)

	Total.	Died	Mortality.	Individual Mortality.
Enlarged prostate ...	831	131	15.8	13.1 — 13.5 — 17.8 — 20.1
Prostatectomy ...	621	88	14.2	12.9 — 14.5 — 17.5 — 20.8

An absolute mortality has a definite value, but a more satisfactory way is to contrast two sets of comparable statistics. This I can fortunately do. Mr. Max Page, in the *St. Thomas's Hospital Reports* for 1910, published the results of prostatectomy at St. Thomas's Hospital, and these can be compared with more recent figures (see Table IV).

It is at once apparent that the mortality from prostatic trouble has not materially fallen; that of prostatectomy has fallen from 20.2 per cent. to 14.5 per cent., but the total operative mortality has somewhat risen.

It will be seen that the surgeon has been more chary in performing the one-stage operation, and that the deaths that formerly would have been recorded under prostatectomy are now found under cystostomy. If hospital statistics are to be improved the patients must seek help earlier than hitherto.

A striking fact is the good results that follow the two-stage operation, in spite of certain disadvantages.

In conclusion, I think one may say that, whatever is the true mortality of prostatic enlargement, the outlook for the prostatic patient has improved out of recognition since 1886.

Table IV.—*Simple Enlarged Prostate.*

Treatment:	1905–1910. Total Cases 131. Died 28.				1922–1926. Total Cases 219. Died 44.					
	Suprapubic Prostatectomy.		Suprapubic Cystostomy.		Suprapubic Cystostomy.		Suprapubic Prostatectomy—Two-stage.		Suprapubic Prostatectomy—One-stage.	
	Total.	Died.	Total.	Died.	Total.	Died.	Total.	Died.	Total.	Died.
	69	14	20	4	41	21	77	9	68	12
Method mortality	20.2		20.0		51.2		11.7		17.6	
Prostatectomy mortality	20.2						14.5			
Total operative mortality	20.2				22.5					
Total mortality	21.7				20.1					

THE ADMINISTRATION AND THERAPEUTIC USES OF OXYGEN.

I.—OXYGEN ADMINISTRATION.*

BY

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THE first consideration with regard to oxygen administration is the object to be attained. Oxygen administration is necessary in any circumstances where the tissues are labouring under the disadvantage of oxygen lack. Following the classification of Barcroft[1] we may divide these conditions into three types. In the first of these, anoxic oxygen lack, owing to alteration in the atmospheric environment or to impairment of the gaseous exchanges in the lungs, the arterial blood does not contain its normal amount of oxygen. In the second, the anaemic type of oxygen lack, owing to deficiency or alteration of the haemoglobin, the blood is unable to carry the oxygen which is presented to it in the pulmonary alveoli. In the third or stagnant type of oxygen lack the arterial blood contains its normal amount of oxygen, but, owing to local or general circulatory causes, an insufficient amount of blood reaches the tissues, which are therefore deprived of oxygen. The untoward effects of all these three conditions can be overcome, more or less completely, by the administration of oxygen, but the amount of oxygen necessary to attain this end varies.

In the anaemic and in the stagnant type of oxygen lack it can be assumed that the arterial blood is carrying as much oxygen as it is capable of doing in combination with the haemoglobin, and, in order to increase the amount of oxygen carried to the tissues, it is necessary, apart from therapeutic methods directed towards improving the circulation, to increase the amount of oxygen in simple solution in the blood plasma. This can only be done effectively by increasing greatly the partial pressure of oxygen in the air in the lungs. Normally the lung alveolar air contains approximately 14 per cent. of oxygen, which, at ordinary barometric pressures, is equivalent to an oxygen pressure of approximately 100 mm. of mercury. At this pressure the amount of oxygen in simple solution in the blood is 0.3 volume per cent., while, assuming the percentage of haemoglobin to be normal, the amount of oxygen in combination will be 18.5 volumes per cent. If the partial pressure of oxygen be raised to 720 mm., which would occur if the subject inspired pure oxygen, the amount of oxygen in combination with haemoglobin would remain unaltered, but the amount in simple solution in the plasma would be increased to 2.2 volumes per cent. This would provide a considerable increase in oxygen available to the tissues, and would be sufficient to overcome the tissue oxygen deficiency in some cases of anaemic and stagnant oxygen lack.

As regards the anoxic type of oxygen lack, such a high alveolar oxygen pressure is seldom, if ever, necessary. The conditions met with clinically where oxygen lack of this type occurs are pneumonia, pulmonary oedema, acute bronchitis, and various other acute and chronic inflammatory diseases of the lungs. In a general way it can be stated that in such conditions, owing to inflammatory or oedematous thickening of the alveolar epithelium, oxygen is able to pass into the blood less readily than normally. According to the severity and the extent of such abnormality a variable degree of increased partial pressure of oxygen in the alveolar air is necessary in order that normal amounts of oxygen may reach the blood. In certain clinical conditions there may be a combination of the stagnant and anoxic types of oxygen lack; such, for example, occurs in conditions of congestive cardiac failure. In such circumstances, owing to the cardiac lesion, the blood supply to the tissues is greatly diminished, while increasing oedema of the lungs produces the anoxic type of oxygen lack; consequently the myocardium suffers more and more from oxygen deficiency and so can less readily perform its functions, thus producing a vicious circle of the most ominous type. The relief of tissue oxygen lack of all types can be attained by increasing to a sufficient degree the pressure and, therefore, the percentage of oxygen in the alveolar air of the lungs.

Ordinary air contains approximately 21 per cent. of oxygen, and in normal circumstances the alveolar air of the lungs contains some 6 per cent. less. In order to raise the alveolar oxygen percentage it is necessary either (*a*) to increase the amounts of air breathed without increasing proportionately the metabolic demand for oxygen, or (*b*) to increase the percentage of oxygen inspired. In order to increase the amount of air breathed some form of respiratory stimulus is necessary. The amount of increase must be large; but, however large it is, it is impossible to increase the alveolar oxygen percentage above approximately 18 per cent. Carbon dioxide forms the most potent respiratory stimulant, and Table I shows the increase in pulmonary ventilation and in alveolar oxygen percentage which can be attained by the administration of this gas. This, however, is not a satisfactory method of dealing with the majority of clinical conditions in which there is anoxic oxygen lack. It offers, however, a valuable means of dealing with oxygen lack due to carbon monoxide poisoning.

TABLE I.

Subject.	Respiratory Rate.	Pulse Rate.	Respiratory Minute Volume (Litres).	Litres CO_2 per minute added to Inspired Air.	Alveolar Air.	
					CO_2.	O_2.
					Per cent.	Per cent.
H. W. D.	9.0	72	6.67	—	5.70	14.21
	10.0	72	7.35	—	5.68	14.23
	10.5	72	13.97	0.6	6.58	16.62
	10.5	70	15.5	0.7	6.61	16.74
	12.0	70	19.17	1.1	6.81	17.61
N. W. R.	11.0	74	7.1	—	5.09	14.88
	11.0	72	7.7	—	5.24	14.89
	11.0	70	13.0	0.5	6.19	16.91
	13.5	66	17.9	0.85	6.42	17.40
	15.0	70	24.2	1.4	6.87	17.65

The percentage of oxygen in the inspired air may be increased in one of two general ways. By the first the patient may be placed in a large chamber or some type of bed tent, where the oxygen percentage can be raised to any required degree. In practice, however, it is difficult by means of the oxygen chamber to attain an oxygen percentage of more than 60, and, in any case, the high initial cost, the necessity for skilled supervision, and the imperative need for elaborate precautions against fire, limit the use of oxygen chambers to comparatively few large institutions. I do not wish, however, to deprecate the use of oxygen chambers, for in certain chronic respiratory diseases, where prolonged oxygen treatment is necessary, or in such severe acute conditions that the patient is unable to tolerate a mask or other ordinary means of administration, an oxygen chamber is extremely valuable.

It is possible to arrive at somewhat similar results to those attained in the chamber by "closed circuit" methods of oxygen administration. In such a method the patient inspires from a suitable apparatus (spirometer or Douglas bag) filled with the desired percentage of oxygen. By a suitable arrangement of valves the expired air passes through purifiers which remove carbon dioxide and water, and then returns to the inspired air container, oxygen being added in accordance with the metabolic requirements of the patient. This amount can be gauged by the initial rate of diminution in volume of the spirometer or bag. By maintaining this volume at a constant, the percentage of oxygen in the inspired air remains steady. For administering oxygen in such a manner, a Benedict or Krogh metabolism apparatus is quite suitable. Such an apparatus has also been devised by Dr. Poulton. A further advantage of these two methods is that, assuming the chamber or breathing circuit to be free of leaks, the amount of oxygen needed to maintain a constant percentage is only that required to fulfil the metabolic requirements of the subject, an amount which would seldom exceed half a litre per minute. Although this advantage holds in practice with

* The opening paper of a discussion on the administration and therapeutic uses of oxygen in the Section of Therapeutics and Pharmacology at the Annual Meeting of the British Medical Association, Edinburgh, 1927.

"closed circuit" methods, yet in the case of the chamber the loss of oxygen due to leaks and to the necessary entry and exit of nurses and others is very considerable. In the oxygen chamber at the hospital of the Rockefeller Institute, New York, the amount of oxygen required to maintain the oxygen in the chamber at 40 per cent. was approximately of the order of 5 litres a minute, and this in spite of the fact that the chamber was carefully designed and was built almost regardless of cost. Considerably larger amounts were necessary in order to maintain the oxygen percentage at approximately 60. A description of this chamber has been published by Binger.[2] As regards the Guy's Hospital chamber, Campbell and Poulton[3] state that it was "not easy to raise the average percentage of oxygen during the twenty-four hours much above 40 per cent."

The second general method consists in the addition of oxygen to the ordinary inspired air, and, in order to know the percentage of oxygen inspired, it is necessary to have as accurate as possible an idea of the rate of oxygen flow and the total amount of air breathed. Thus, for example, oxygen administered at a rate of 2 litres a minute to a patient having a total respiratory volume of 5 litres a minute would be more effective than in a case where the total respiratory volume was 10 litres a minute. With a simple apparatus in which the oxygen flow is continuous, the oxygen flowing during the expiratory phase of respiration would be completely lost, so that the effective flow of oxygen added to the inspired air and actually entering the respiratory tract would be 1 litre a minute. In the first case the patient would be inspiring 4 litres of air containing approximately four-fifths of a litre of oxygen, and 1 litre of pure oxygen, so that the total amount of oxygen would be one and four-fifths litres in 5 litres, or 36 per cent. In the second instance the amount of air breathed would be 9 litres containing one and four-fifths litres of oxygen *plus* the one litre of pure oxygen in a total of 10 litres—approximately 28 per cent. The alveolar oxygen percentage would be respectively 30 and 22, very approximately. So, in order to gauge more or less approximately the effect of a given amount of oxygen, it is necessary to know the total respiratory minute volume as well as the rate of oxygen flow. If, however, the method adopted for the administration of oxygen enables the gas to be conserved during the expiratory phase of respiration, then the effect of a given rate of oxygen flow will be approximately doubled.

From these considerations it can be seen that, knowing the total respiratory minute volume and the rate of oxygen flow, it is easily possible to calculate the percentage of oxygen in the alveolar air. When this is done and compared with the actual observed alveolar oxygen percentage, a figure can be obtained which indicates quantitatively the percentage efficiency of any given method for the administration of the oxygen. Comparisons of various methods were made in this manner by Dr. Gilchrist and myself.[4] Table II shows figures which illustrate the results obtained. The very low figures obtained for the tube and funnel and nasal catheter methods are due mainly to the fact that only half the oxygen administered by these means enters the respiratory tract, the other half being carried away with the expired air. It is rather surprising that the nasal catheter showed figures which are only slightly better than those for the tube and funnel. It can be seen, however, that with large rates of oxygen flow a considerable increase in alveolar oxygen percentage can be obtained by both of these methods, but the low efficiency percentage indicates the very considerable wastage of oxygen necessary to attain this object.

It will be well, perhaps, to consider briefly rates of oxygen flow. Not infrequently in hospital wards, even in the wards of big teaching hospitals, oxygen is delivered from a funnel held at a varying distance from the patient's face, the gas bubbling through a wash-bottle at rates at which the bubbles can readily be counted. We have set up similar apparatus and found that the maximum rate at which the bubbles can be counted is approximately five a second. When a flow meter was placed in series with such a system and with such a rate of bubbling, it was found that the actual rate of oxygen flow was not more than a quarter of a litre a minute. Analysis of a sample

TABLE II.—*Showing Percentage Efficiency of Different Methods of Oxygen Administration at Various Ratios of Oxygen Flow to Respiratory Volume per Minute.*

Method.	Rate of O_2 Flow L.P.M.	Respiratory Volume L.P.M.	Calculated Alveolar O_2 per cent.	Observed Alveolar O_2 per cent.	Efficiency Expressed as Percentage.
Tube and funnel*	2.0	6.2	40	27	49
	4.0	6.1	67	29	29
	8.0	6.2	94	47	41
Nasal catheter.	2.0	6.2	40	28	53
	4.0	6.7	62	33	40
	8.0†	6.2	94	43	37
Haldane.	2.0	9.5	31	32	100
	3.0	8.7	42	44	100
	4.0	8.5	52	50	95
	8.0	9.0	85	69	77
	9.5	9.2	94	67	66
D. G. apparatus with nasal tube.	2.0	6.2	40	42	100
	4.0	8.8	51	50	97
	8.0	8.7	90	65	67
D. G. apparatus with mask.	10.0	10.7	91	90	99
	9.0	8.9	94	92	97
	5.0	10.5	53	53	100
	4.0	10.5	45	44	97
	2.0	10.5	30	30	100

*The funnel was touching the nose and chin when the rate of O_2 flow was 2 and 8 litres a minute; it was 2 in. from the tip of the nose when the rate was 4 litres a minute.
†There was great discomfort at this rate of flow.

of alveolar air after breathing for five minutes at this rate of flow showed an oxygen percentage of only 15.2—a negligible increase above the normal. With a rate of flow of 2 litres a minute, the oxygen percentage rose to 27. At this rate the oxygen passed through the wash-bottle in a continuous and vigorous stream. In general it can be said that, with the small rates of oxygen flow usually adopted, the tube and funnel and nasal catheter methods are absolutely ineffective, that the increase in alveolar oxygen percentage is so small that, apart from possible psychological effects, no benefit to the patient can possibly be attained. This probably accounts for many of the statements to the effect that oxygen administration is of little or no benefit. In the administration of other drugs, in the regulation of diet, indeed in the application of almost any therapeutic agent, quantitative methods of dosage are used. Surely with all the facilities of modern science similar quantitative methods can be used in the administration of oxygen. It is only with the certain knowledge that an effective concentration of oxygen in the inspired or alveolar air has been obtained that it can justly be said whether or not oxygen is of benefit.

There is a further objection to the nasal catheter method. The rate of oxygen flow necessary to produce a satisfactory increase in the alveolar oxygen percentage is so large that great discomfort is caused, except in subjects where the respiratory minute volume is small and the necessary rate of oxygen flow therefore less—as, for example, in infants. For minor degrees of respiratory disturbance an alveolar oxygen concentration of somewhere between 25 and 30 per cent. will be sufficient to abolish oxygen lack. This can be attained by the tube and funnel or by the nasal catheter with an oxygen flow of approximately 5 litres a minute and a respiratory minute volume of not more than 10 litres a minute.

The first widely adopted method of administering oxygen quantitatively was that of Haldane,[5] which was introduced during the war and used with very marked benefit for the treatment of war gas poisoning. The oxygen is delivered into a small bag attached to a mask, and remains in the bag during the expiratory phase of respiration. During inspiration oxygen is sucked from the bag, and from an additional opening in the mask sufficient amounts of ordinary atmospheric air are inspired to satisfy the total respiratory requirements. During expiration the slight increase in pressure, due to the air passing out through the opening in the mask, is sufficient in ordinary circumstances to hold the oxygen back in the bag. By this means the oxygen is conserved during the expiratory phase and a saving of 50 per cent. of the gas is effected. The rate of oxygen flow can be regulated as desired by means of a reducing valve and calibrated needle valve. From the

figures already shown in Table II it can be seen that where the rate of oxygen flow is not greater than half the respiratory minute volume this apparatus shows a very high degree of efficiency, but where the rate of oxygen flow approaches the respiratory minute volume the efficiency falls very markedly. This is due to the fact that however much oxygen is flowing a certain amount of air will be sucked through the expiratory opening of the mask. Yet in practice, on account of its simplicity, the Haldane apparatus remains the most suitable for ordinary clinical use, its disadvantage being merely that it is almost impossible to obtain an alveolar oxygen percentage of much more than 60; such a high concentration is, however, seldom necessary. A further disadvantage is that, although the rate of oxygen flow can be fixed at any desired amount, yet the apparatus affords no means for determining the total respiratory minute volume. Hence, unless this is independently obtained, it is impossible to calculate the alveolar oxygen percentage. In order to overcome this deficiency, a modified form of apparatus was devised by Dr. Gilchrist and myself.[4 6]

The apparatus comprises a suitable cylinder head attachment with a reducing valve and a fine adjustment regulating valve. From this the oxygen passes through a simple type of flow meter calibrated in litres per minute and reading up to 15 litres. From this point it passes to a bag of a capacity sufficient to hold approximately 5 litres of oxygen; it then passes through a valve and thence to the mask. The valve should be of such a type as to enable the flow of gas to be observed, and for this reason it seemed to us that the old-fashioned type of Müller water valve would be the best. This not only acts as a valve, but, in addition, serves to moisten the oxygen; and, further, if it be surrounded by an outer vessel filled with hot water, the stream of oxygen can also be warmed. It is not considered that warming *per se* is very necessary; the advantage of the warming is that a larger quantity of water vapour is taken up by the gas at the higher temperature, and this overcomes the tendency to uncomfortable drying of the upper respiratory passages when high percentages of dry oxygen are used. The mask has the usual pneumatic rubber pad surrounding it, which enables it to be applied without any leakage. The body of the mask is fitted with three openings; through the first the oxygen passes from the Müller valve, the second is an expiratory valve, and the third an extra air valve, which can be completely closed or opened to any desired extent. When this valve is closed and the mask is applied without leaks, the flow of oxygen must be made sufficiently large to satisfy the total respiratory needs of the subject. If the rate of oxygen flow is too great the bag will become overdistended, and the oxygen, instead of bubbling through the Müller valve only during the inspiratory phase, will pass continuously through it, the excess passing directly out through the expiratory valve on the mask.

This is what should always be done at the commencement of administration. Before applying the mask to the patient the oxygen should be turned on at a rate slightly greater than what is considered a probable respiratory minute volume and the bag allowed to become well filled. If the mask, before the oxygen is turned on, be applied to a patient suffering from oxygen lack, the discomfort of the patient will be greatly increased, and he will not infrequently adopt a psychological attitude which will render the further use of the mask very difficult. Normally when a mask is applied the subject immediately, consciously or unconsciously, experiences the feeling that his air supply is going to be restricted, and he instinctively takes a big breath. Unless there is air or oxygen passing through the inlet tube in sufficient quantity to satisfy his demands, the state of mind mentioned above will be established, hence the necessity for a very liberal supply of oxygen during the first minute or so. If the rate of oxygen flow be less than the respiratory minute volume, the extra air valve mentioned above being closed, then the bag will become more and more empty until a point is reached where, before completion of an inspiration, the bag will be completely empty. By watching the bag and adjusting the rate of oxygen flow so as to avoid these two alternatives—namely, (1) wastage of oxygen through overfilling the bag, and (2) failure to satisfy the respiratory needs due to emptying the bag—a rate of oxygen flow can easily be attained which is just sufficient to satisfy the respiratory requirements of the patient. A reading of the flow meter at this point indicates very approximately the patient's respiratory minute volume. In these circumstances the patient will be breathing pure oxygen, which for therapeutic purposes is not usually necessary, this being merely a preliminary proceeding to estimate approximately the patient's respiratory minute volume and so determine the rate of oxygen flow necessary to produce any desired alveolar oxygen concentration.

TABLE III.—*Showing maximum percentage of oxygen obtainable in the alveolar air at various minute volumes of respiration when oxygen at different rates of flow is added to the inspired air—for example, a subject breathing at 6 litres per minute, and with 3 litres of oxygen per minute added to the inspired air, should have an alveolar oxygen percentage of 54.*

		Respiratory Minute Volume in Litres.										
		3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
Litres per Minute Oxygen Flow.	1	41	34	30	28	26	24	23	22	22	21	21	20
	2	67	54	46	41	37	34	32	30	29	28	27	26
	3	94	74	62	54	48	44	41	38	36	34	33	32
	4	—	94	78	67	60	54	50	46	43	41	39	37
	5	—	—	94	80	71	64	58	54	50	47	45	43
	6	—	—	—	94	82	74	67	63	58	54	51	48
	7	—	—	—	—	94	84	76	70	65	61	57	54
	8	—	—	—	—	—	94	85	78	72	67	63	60
	9	—	—	—	—	—	—	94	85	79	74	69	65
	10	—	—	—	—	—	—	—	94	86	80	75	71
	11	—	—	—	—	—	—	—	—	94	87	81	77
	12	—	—	—	—	—	—	—	—	—	94	87	82

Table III, taken from the paper by Gilchrist and myself, shows the alveolar oxygen percentages produced by any combination of respiratory minute volume and rate of oxygen flow within normal limits, but in general it can be said that with an apparatus such as this, or that of Haldane, which conserves oxygen during the expiratory phase, a rate of oxygen flow equal to one-fifth of the respiratory minute volume will raise the alveolar oxygen percentage to 30. Where it is one-fourth, the percentage will be 34; one-third, 41; one-half, 67; and where the rate of oxygen flow equals the respiratory minute volume the alveolar oxygen percentage rises to its maximum of slightly more than 94 per cent., the remaining gas being the normal 5 to 6 per cent. of carbon dioxide. The preliminary administration of pure oxygen at a rate equal to the respiratory minute volume should immediately abolish the urgent symptoms of oxygen lack, unless the latter be of the anaemic or stagnant type of a very severe degree. Much lower concentrations are usually sufficient. Therefore the rate of oxygen flow is then reduced to such a proportion of the respiratory minute volume as is required to produce whatever alveolar oxygen percentage may be considered necessary. The extra air valve is then opened to the required extent. If too much extra air is given, the normal amount of oxygen will not be sucked through the Müller valve with each inspiration, and the bag will tend to become overfull. If too little extra air be given, the reverse will be the case, and the bag will be sucked empty. So that the same observation of the bag and the flow of oxygen through the Müller valve is necessary in adjusting the extra air orifice as in the initial determination of respiratory minute volume.

The description suggests that the method may be unnecessarily complicated, but it works well in practice. Precise knowledge of the alveolar oxygen percentage is much more than a mere academic nicety; not only is there the satisfaction of producing a definite effect, but also the percentage of alveolar oxygen necessary to abolish the symptoms of oxygen lack affords a quantitative indication of the severity and extent of the pulmonary damage. Where not more than 40 per cent. of alveolar oxygen is necessary—that is to say, where the rate of oxygen flow is not more than one-third of the respiratory minute volume—the mask can be dispensed with, for it has been found that the forked nasal tube, described by Gilchrist and myself,[4 6] is perfectly efficient for such rates of oxygen flow. We have found this to be the case even where the patient has fallen asleep and

breathed partly or mainly through his mouth. The forked nasal tube can, of course, be used only in cases where there is no nasal obstruction.

Full descriptions of the symptoms of oxygen lack will be found in the published works of Haldane,[7] the monographs of Lundsgaard and Van Slyke,[8] Means,[9] and Meakins and myself.[10] Oxygen administration is necessary mainly in the treatment of anoxic oxygen lack, and here the ideal is to administer just sufficient oxygen to restore the oxygen saturation of the arterial blood to its normal level. This requires facilities for blood-gas estimations which are not generally available. There are, however, other and simpler criteria of adequate oxygen administration.

The first criterion is the abolition of cyanosis. It is possible, however, that this may occur before the oxygen lack has been completely abolished. Moreover, a significant degree of oxygen lack may exist without any appreciable amount of cyanosis; for, as has been shown by Lundsgaard and Van Slyke,[8] cyanosis, apart from that of the stagnant type, does not occur with an arterial oxygen saturation of more than 80 to 85 per cent., a moderately severe degree of oxygen lack, the normal arterial oxygen saturation being approximately 96 per cent. Hence it can be seen that rather more oxygen should be given than is just sufficient to abolish cyanosis completely. Moreover, as Meakins[11] has indicated, the aim in the treatment of acute respiratory conditions is to prevent rather than to treat cyanosis and oxygen lack.

The second criterion is the relief of dyspnoea. This cannot always be brought about. In many respiratory diseases the respiratory embarrassment is due to causes which continue to operate after the oxygen lack has been abolished by effective oxygen administration—for example, pleural friction. It can, however, be dogmatically asserted that the respiratory embarrassment is always aggravated by oxygen lack. Hence the effect of oxygen administration will always be to produce a certain amount of relief to dyspnoea, although in certain cases the subjective relief may not be very great, especially in those cases where the oxygen lack is accompanied by carbon dioxide retention. A very good example of different types of oxygen lack is given in the experiments on rapid breathing by Binger, Brow, and Branch.[12] These observers produced pulmonary embolism in two different ways: in the first case they produced embolism of the pulmonary capillaries by the intravenous injection of a suspension of starch granules. After a certain point a marked increase in respiratory rate occurred, frequently associated with arterial oxygen deficiency. When this oxygen lack was abolished by oxygen administration there was a certain amount of reduction in the respiratory rate, but to nothing like the normal level. Apparently some reflex, probably due to irritation of the branches of the afferent vagi in the lungs, was concerned in the maintenance of this abnormally rapid rate. In the other series of experiments embolism of the larger branches of the pulmonary arteries was produced by the introduction of seeds of various sizes. In this case increase in the respiratory rate also occurred, associated with anoxaemia, but on abolition of the anoxaemia by oxygen administration the respiratory rate returned to its normal level. In certain conditions, therefore, oxygen administration may produce a fall in respiratory rate associated with relief of dyspnoea. Such, however, is not necessarily the case, and the continuance of respiratory embarrassment is not always an indication that the oxygen lack has not been effectively abolished and that oxygen therapy has been ineffective.

A third, and probably the most reliable, criterion of successful oxygen administration is a fall in pulse rate. This occurs even in normal individuals when increased percentages of oxygen are breathed, while in conditions of oxygen lack, of both the anoxic and stagnant types in congestive cardiac failure, effective oxygen administration produces quite considerable and significant diminutions in pulse rate, the only exception, so far as I am aware, being in a case of circulatory failure with heart-block, described by Meakins and myself,[10] where administration of oxygen appeared to restore the conduction of the cardiac impulse and the pulse rate was approximately doubled.

Barach,[13] in assessing the value of oxygen therapy in the treatment of pneumonia, notes the diminution of restlessness, promotion of sleep, and the tendency to lessened delirium. It cannot, however, be too strongly emphasized that the changes in the central nervous system of which delirium is a manifestation are the result of oxygen lack, and that they should be prevented by the early administration of oxygen. Once these changes have occurred the relief of oxygen lack may prevent their further development, but does not always abolish them. As a physiologist fully conscious of limited clinical experience, I may here appeal for caution in the use of stimulant drugs in the treatment of pneumonia. These can only increase the excitability of the central nervous system and intensify the demand of the tissues for oxygen. Sedatives may, however, be safely employed, provided that oxygen lack is prevented by effective oxygen administration.

In the treatment of acute respiratory diseases the value of oxygen administration is to tide the patient over the period of functional deficiency and so prevent damage to the central nervous system, myocardium, and other tissues. In this way it may be compared with the restriction of carbohydrate intake in diabetes and of nitrogenous intake in certain types of acute nephritis. Barach,[13] writing of the effect of oxygen administration in lobar pneumonia, states that "the value of oxygen treatment is felt to be supportive and not curative. In severe dyspnoea with cyanosis oxygen treatment has appeared to prolong life until such a time as the immunity mechanism was able to accomplish recovery."

Similarly, in the treatment of the respiratory embarrassment of congestive cardiac failure, the prevention or relief of anoxic anoxaemia will prevent further myocardial damage, and tide the patient over the critical period until the measures directed towards circulatory improvement have their effect.

Lastly, the value of oxygen administration in the treatment of chronic respiratory diseases may be briefly mentioned. Barcroft and his co-workers[14] have found that many patients suffering from chronic disability resulting from war gas poisoning were permanently relieved by temporary residence in the oxygen chamber. Similar encouraging results have recently been reported by Campbell and Poulton[15] in cases of chronic bronchitis and emphysema. Dautrebande[16] has shown the value of oxygen in relieving dyspnoea and diminishing the amount of cough and expectoration in cases of pulmonary tuberculosis.

Knowledge of the functional changes in chronic respiratory diseases is all too scanty, and the means at present adopted for their relief all too few. Investigation of the blood gases and of the respiratory exchange affords quantitative evidence of the functional deficiency, while estimations of the vital capacity and lung volume, combined with other simple physical measurements, indicate the extent and severity of the structural changes. All these investigations are necessary for an exact estimate of the value of any particular method of treatment. The relief of the functional deficiency, even when only temporary, allows various healing and restorative processes to come into play and breaks what is frequently a vicious circle. In view of the very great importance of chronic respiratory diseases as causes of ill health and of economic loss, it is impossible to appeal too earnestly for more extensive investigation, which would involve active co-operation between physiologists, immunologists, and clinicians. The field is a fruitful one, and the workers would have before them the certainty that their labours would result in the relief of much suffering.

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II.—INDICATIONS FOR OXYGEN THERAPY.

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Although the symptoms and signs of anoxaemia are protean, it is recognized that the two chief clinical manifestations of general anoxaemia are dyspnoea and cyanosis, that the onset of the former usually precedes that of the latter, and that dyspnoea is often so urgent as to call for speedy, or even immediate, relief. Chronic anoxaemia of lesser degree may interfere gravely with the functional efficiency of various organs and tissues, and ultimately lead to structural changes in them.

It is mainly in the hope of relieving severe dyspnoea that oxygen is administered. If dyspnoea and cyanosis were due solely to deficient oxygenation of the blood in the lungs it might be thought that the deficiency would be met by adding oxygen to the inspired air, and thus restoring to a normal level the oxygen tension of the alveolar air and the oxygen saturation of the arterial blood. Unfortunately the problem is not so simple; nevertheless this is the essential basis of oxygen therapy.

The methods of administering oxygen are far from satisfactory. The volume of oxygen that is delivered from the cylinder is only approximately known; we know less regarding the amount inspired by the patient, while that which diffuses into his pulmonary capillaries is largely a matter of conjecture. In the administration of oxygen a common fault is to give too little. If oxygen is required we must give ample—not less than 2 litres a minute. This corresponds approximately to a free, rapid bubbling of the gas through water in a wash-bottle. Oxygen is rapidly absorbed and rapidly consumed; there is no mechanism for the storage of oxygen in the fluids or tissues of the body. Any good effect derived from oxygen therapy is extremely evanescent, often lasting for not more than a few minutes. If oxygen is required it ought to be administered as continuously as is possible; to administer it for a few minutes every few hours, or even several times an hour, is of very little, if any, value. I never use a glass funnel held some inches from the face; a moulded glass face-mask is more efficient, and it is less irksome to the patient than either an oral or nasal tube. Haldane's apparatus is the most economical and reliable; I use it regularly in hospital practice.

Clinical observation indicates that oxygen therapy relieves dyspnoea and cyanosis in some patients; in them the fault must have been deficient oxygenation of the blood in the pulmonary capillaries. In other cases in which oxygen therapy is of no value the free entrance of oxygen into the alveoli may be prevented owing to various causes—such as tracheal compression, laryngeal or bronchial spasm, pulmonary emphysema, accumulation of secretion in the air passages, or the presence within the alveoli of dropsical fluid or inflammatory exudate.

Again, oxygen therapy may fail because the dyspnoea is due to causes other than faulty oxygenation of the blood in the lungs; it may be the result of a pathological increase of metabolism, as in hyperthyroidism. Here the abnormality in respect of oxygen is not a lack in the supply of oxygen to the tissues, but their excessive consumption of oxygen. Moreover, the exophthalmic patient whose heart is sound is not dyspnoeic when at rest. Oxygen is likewise of no service in the dyspnoea of anaemia, in which the tissues receive too little oxygen because the lack of haemoglobin involves an inadequate transport of oxygen to them. Even though the anaemia be profound and causing those structural changes with which the physician and pathologist are familiar, the patient is seldom breathless while he is at rest. Diabetic dyspnoea, the air hunger of Kussmaul, has certain distinctive features: the depth of the breathing is greatly increased, the rate is seldom raised. The dyspnoea resembles that following the breathing of air containing an increased content of carbon dioxide, and is therefore presumably not due to want of oxygen. Dyspnoea in diabetes is a sign of grave acidosis; it is not due to anoxaemia, but to increased hydrogen-ion concentration of the blood with consequent disturbance of the acid-base balance, and the administration of oxygen affords no relief. The dyspnoea of the terminal phases of renal disease has other characteristics, one of which is that the respirations tend to become periodic. Periodic, or Cheyne-Stokes, breathing is seen also in other states, notably in those which cause great increase of intracranial pressure. Oxygen is not a satisfactory remedy for the dyspnoea of renal disease, the primary cause of which is probably a retention acidosis, not an anoxaemia. In hydraemic cases pulmonary oedema must gravely interfere with the diffusion of oxygen from the alveolar air into the pulmonary capillaries, and in my experience the addition of oxygen to the inspired air does not lessen the dyspnoea. Cheyne-Stokes breathing, when artificially induced, is one of the late manifestations of oxygen want, and can be relieved by the inhalation of carbon dioxide or oxygen; when it is primarily of cerebral origin it may be abolished while the patient is breathing air to which a little carbon dioxide is being added, but the breathing quickly becomes periodic again after the additional carbon dioxide has been discontinued. In the same case oxygen, too, will render the breathing regular, but the benefit, though more lasting than that of carbon dioxide, is again of short duration. Thus, to be of benefit, the administration of oxygen must be practically continuous.

Oxygen therapy is not indicated in very rapid breathing (tachypnoea) without dyspnoea, such as was not infrequently observed during the war in cases of "shell-shock" and disorderly action of the heart, and oxygen is neither needed nor beneficial in the condition usually termed "hysterical dyspnoea," of which the following is an illustrative case.

A young woman of nervous temperament collapsed soon after a sudden fright. The face was ashen grey with a slightly cyanotic tint in the lips and ears, the pulse rapid and feeble, the blood pressure low, and the breathing so shallow and rapid as to recall that of a puppy panting in the sun. She looked as if she might die at any moment, yet there was no organic disease. Oxygen was administered by Haldane's apparatus without any benefit. The addition of a little carbon dioxide to the inspired air at once lowered her respiratory rate to 24 a minute, the breathing became deeper, and all the urgent signs vanished. Some weeks later she was readmitted in a similar urgent state. While breathing air enriched with oxygen the rate of breathing rose from 46 to 50, but the addition of carbon dioxide lowered it from 48 to 33 a minute.

I conclude that the initial fright had caused deep breathing, an excess of carbon dioxide had been eliminated, and the ratio between the carbonic acid in the blood and the plasma bicarbonate had been disturbed, the blood reaction being shifted towards the alkaline side. The disturbance was therefore an alkalosis from loss of carbon dioxide; it is sometimes termed "acapnia," but is more aptly designated "hypocapnia." In such a condition oxygen is of no avail.

In the treatment of circulatory failure oxygen plays but a minor part. The myocardium is enfeebled and the circulation is retarded. The blood passing slowly through the capillaries becomes unduly desaturated in respect of oxygen, and has added to it an excess of carbon dioxide. Thus the anoxaemia of circulatory failure is primarily a stagnant anoxaemia. So long as the pulmonary circulation remains efficient the blood passing through the lungs becomes again fully oxygenated; enrichment of the inspired air with oxygen does not increase the oxygen saturation of the arterial blood. In the later stages of circulatory failure with persistent dyspnoea even at rest, orthopnoea, cyanosis, and dropsy, the lungs are the seat of venous congestion and oedema. The patient's breathing has become more rapid and less deep, the vital capacity is lowered, and the oxygen content of the alveolar air has fallen. The anoxaemia which now ensues is in itself harmful, and may cause the breathing to become more shallow and rapid. Thus a vicious circle may be established. It is in this later stage of circulatory failure, with urgent dyspnoea, that I always administer oxygen, though realizing that neither on the circulatory failure nor its cause has it any direct influence. Oxygen therapy is more likely to be beneficial, lessening both cyanosis and dyspnoea, when intense dyspnoea has begun suddenly and recently, as in the early phases of auricular flutter, paroxysmal auricular fibrillation, and paroxysmal tachycardia, than when it has

developed gradually and lasted for a considerable time. In the former group of cases oxygen may afford some relief until the paroxysmal disorder of the heart terminates spontaneously or until by appropriate means we have controlled the ventricular tachycardia or restored the normal cardiac rhythm. Even in the group of chronic cases there are some, notably the chronic fibrillators with a very rapid ventricular rate, in whom oxygen lessens the cyanosis and dyspnoea, and, I believe, helps to tide the patient over the phase of grave cardiac failure. In chronic myocardial failure associated with a normal cardiac rhythm there is seldom any benefit to be derived from oxygen therapy.

It is evident that the administration of oxygen can have no influence on the cyanosis due to a congenital septal defect of the heart so large as to permit of much venous blood (at least 38 per cent. according to Lundsgaard and Van Slyke) being shunted from the right to the left side of the heart. We are therefore safe in concluding that if the cyanosis of congenital heart disease disappears while oxygen is being administered there is certainly no large septal defect. The cyanosis of congenital pulmonary stenosis may vanish during the time of oxygen administration, but the effect is so transient that it cannot be regarded as of any therapeutic value.

It is in disease of the respiratory system that imperfect oxygenation of blood in the lungs, with resultant dyspnoea of severe degree and the need for oxygen therapy, is most frequent. The anoxaemia may be due to two factors: (1) lessening of the volume of air which enters the bronchioles, as in tracheal compression and bronchial asthma, and (2) interference with the diffusion of oxygen through the alveolar walls into the pulmonary capillaries, as in acute pneumonia and pulmonary emphysema. Both factors doubtless operate in causing the anoxaemia of pulmonary emphysema and acute pneumonia. In emphysema marked dyspnoea and deep purple cyanosis may persist even while the patient is kept at rest in the semi-recumbent posture, and the frequent administration of oxygen then affords more relief, even though temporary, than is obtainable by any other means.

It is in acute pneumonia that oxygen is most often administered. More than thirty years ago I learned from that wise physician of great clinical experience Sir James Affleck that oxygen therapy may be of great value in acute lobar pneumonia. To-day that opinion is still true. All recent research on the oxygen saturation of the arterial blood in pneumonia, with a demonstrable rise of the percentage oxygen saturation from an unduly low level to one approximately normal during the administration of oxygen, is in harmony with the observations made long since at the bedside that oxygen may be helpful in acute pneumonia.

Every pneumonic patient is dyspnoeic, but it does not follow that he needs oxygen. In the treatment of acute pneumonia oxygen is not my first line of defence—my sure shield is good nursing—nor is it my second or even my third line. Nevertheless just as the special constable had his part to play during the war, so, too, may oxygen therapy help to some extent in the fight against pneumonia. Many patients make an uninterrupted recovery, having never needed oxygen, digitalis, stimulants, or hypnotics. There is one indication for the administration of oxygen in pneumonia—an indication which should never be neglected—and that is cyanosis. There may be differences of opinion regarding the relative parts played by cardiac, vascular, and pulmonary factors in the development of the cyanosis, but there can be no question that the administration of oxygen may relieve both the dyspnoea and cyanosis, and therefore by combating anoxaemia tend to obviate cardio-vascular failure. The faintest trace of cyanosis in the lips, ears, or nose is a call for oxygen. The call becomes urgent if the cyanosis is pronounced; when that ominous combination of pallor and cyanosis develops it is usually too late to hope for much benefit from oxygen therapy. If oxygen is indicated in pneumonia it should be given freely and as continuously as possible. It is undoubtedly more valuable in acute lobar pneumonia than in acute broncho-pneumonia.

While I am an advocate of oxygen therapy in pneumonia, it has never been my good fortune to observe any of the magical effects described by some writers. Acute pneumonia is always a serious disease. During a period of four years ending October, 1926, 955 cases of acute pneumonia (including acute broncho-pneumonia) were treated in the Edinburgh Royal Infirmary. Of patients who were in the first three decades, 92 per cent. recovered; of those in or after the seventh decade only 35 per cent. recovered. Anoxaemia is only one of many factors with which we have to reckon in pneumonia. At the extremes of life, in the destitute, the intemperate, and the obese, and especially in profoundly toxic cases such as those during the epidemic of 1918-19, oxygen therapy is usually powerless to avert a fatal issue.

Discussion.

Dr. R. Hilton (London) said that he had examined the oxygen content of blood obtained by arterial puncture in various conditions, including pneumothorax; it was remarkable that there was no drop in the oxygen saturation of arterial blood in this condition. This implied that the circulation through collapsed portions of lung must be extremely small, otherwise the arterial stream must inevitably be polluted with venous blood. He showed lantern slides illustrating experiments in which he had administered oxygen by various methods, and determined the oxygen content both of alveolar air and of arterial blood. He agreed that the funnel method was useless. He had obtained good results by the nasal catheter method, though he found that if the gas were given at too great a rate much discomfort was produced. He showed that a small but not a negligible rise in arterial oxygen tension could be produced by such small amounts of the gas as 0.75 to 1 litre a minute when given by nasal catheter. He added that eating, coughing, and expectoration were not interfered with by the presence of the catheter. He discussed some satisfactory results which he had obtained with a mask he had devised, and which was demonstrated.

Professor C. W. Greene (Missouri, U.S.A.) emphasized the necessity of continuous oxygen therapy from its commencement until the crisis which it was intended to combat had passed. The physiological reactions to an increased supply of oxygen were remarkably prompt. In progressive anoxaemia induced on normal men or animals, if, when the limit of endurance was approaching, a momentary flood of oxygen was supplied, then the heart slowed, the blood pressure decreased, and the respirations became almost normal in rate and depth—all in a few seconds the skeletal motor reactions, the alimentary motor augmentation, and other less easily followed asphyxial nerve reactions quieted down. When the anoxaemial condition was re-established these reactions as promptly returned. In disease—during anoxaemial crisis in lobar pneumonia, for example—the same conditions operated, modified by the toxaemia and the particular pathological condition of the patient. The danger of interruption of the extra oxygen supply was that the patient might not stand the shock of the sudden recurrence of the anoxaemial nervous reactions.

Dr. Carl H. Greene (Mayo Clinic) stated that the oxygen treatment of pneumonia had been investigated during the last few years by Drs. Boothby and Wilder at the Mayo Clinic. They had used both the oxygen chamber and the oxygen tent with success, though the latter was less complicated and was more suitable for ordinary hospital practice. By such means the cyanosis in pneumonia could usually be completely controlled. If treatment was continued for a sufficient period it might unquestionably save life. Most striking features were the reduction in the pulse rate and the decrease in the fever. The results, however, emphasized the fact that anoxaemia was only one factor in the mortality from pneumonia, and it was only by estimating also the relative importance of the other factors that the final value of oxygen therapy could be determined.

THE RELATION OF THE SEX OF OFFSPRING TO THE TIME OF COITUS DURING THE OESTROUS CYCLE.*

BY

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THERE are many who hold the opinion that in the case of the human as well as in other animals, the length of time which elapses between the extrusion of the ovum from the ovary and its fertilization by the sperm is a decisive factor in determining the sex of the resulting individual. This hypothesis was elaborated at length by Thury (1863, 1864), who maintained that an ovum when first extruded was female in respect of its potentialities, but that at some point during its passage along the genital tract it became male. Fertilization immediately after ovulation yielded a female, fertilization some time later yielded a male, and fertilization at points between these times resulted in the production of intersexual forms. Thury, applying this hypothesis to the problems of practical animal breeding, was able to claim that, in the case of cattle, service during the earlier phases of oestrus yielded a preponderance of heifer calves, whereas service towards the end of oestrus resulted in the production of an excess of males. Thury's hypothesis was accepted and endorsed by Baust (1871), Guiard (1903), and Bell (1914). But it is reasonable to question the validity of these observations, since it is now known that it is a matter of considerable difficulty to recognize the exact stage of oestrus exhibited by an animal such as the cow. Moreover, the exact relationship of oestrus and ovulation in these forms is not clear even yet.

It is the case, however, that recent work has revealed considerable evidence which seems to show that sex-reversal of the egg before fertilization does occur in certain forms. The experiments of Hertwig (1906, 1912), of Kushakevitch (1910), and of Witschi (1914) have shown, for example, that delayed fertilization and also the exposure of the ova of the frog to high temperature before fertilization lead to a profound disturbance of the sex ratio among the resulting generation. If the male frog was permitted to fertilize half of the eggs of the female and was then removed, to be replaced after an interval to fertilize the remaining eggs, after the lapse of eighty-nine hours none but male offspring were obtained from the second half. It was established that this result was not due to a selective fertilization, to a sexually selective mortality among the embryos, or to the abnormal extrusion of the X-chromosome from the ovum during its maturation. The correct interpretation of the results would seem to be that some 50 per cent. of the eggs were fertilized by X-chromosome-bearing spermatozoa to become genetic females (XX in chromosome constitution), but that the conditions of the experimentation were such as to transform them into individuals with the characterization of the male, the sex-chromosome constitution of the zygote being overridden by the effects of delayed fertilization upon the metabolism of the egg before fertilization. King (1912) has shown that desiccation of the toad's egg yields exactly opposite results. She obtained 87 per cent. of females in an experiment in which the mortality among individuals of unknown sex was insignificant. The interpretation of her results would appear to be similar.

It has been found by Whitman (1919) and Riddle (1912, 1916) that the mating of pigeons and ringdoves belonging to two widely different zoological families results in the production of male offspring only, and that female offspring alone were obtained from the eggs of doves which had been forced to lay excessively and at an abnormally rapid rate. In birds the female is the digametic sex. Riddle was able to show that eggs which yield males can be distinguished from those which yield females, that maleness is associated with eggs of smaller size, higher water content, and less stored energy, and that the production of none but males or of none but females is associated with the antecedent production of eggs of one or of the other kind. He submits that delayed fertilization leads to an increased metabolic rate in the egg, and that a high metabolic rate leads directly to the development of a male-type physiological state and characterization. Wide crossings involve the pooling of hereditary factors which in their action lead to the establishment of one or other kind of metabolic level, male or female, in the zygote. Extending his conclusions to the case of cattle, Riddle suggests that the greater production of males from eggs which have remained unfertilized for a period of hours is almost certainly correlated with an increased water content which the eggs obtain before fertilization. He grants that it is not established that the mammalian ovum does indeed take up water from the fluid it encounters in the reproductive passages, but points out that this is so in the case of every amphibian, reptile, and bird so far examined. However, it still remains to be shown that what applies to the amphibian applies also to the case of the mammal.

Russell (1891) had collected data relating to the sex ratio of calves according to the time of service during the oestrous period, and this investigation was continued and extended by Pearl and Parshley (1913), who published the following data.

TABLE I.

Time of Coitus.	Total Offspring.	Males.	Females.	Sex Ratio.
Early in oestrus... ...	248	123	125	98.4
Middle of oestrus ...	125	67	58	115.5
Late in oestrus	107	65	42	154.8
	480	255	225	113.3

From these figures the authors concluded that the time of service had an appreciable influence upon the sex ratio. In a later paper by Pearl (1917), however, additional data were considered, and the conclusion reached that there was no definite or permanent relation between the time in the heat period at which the cow was served and the sex of the offspring. The commonly held opinion of the breeder and the suggestiveness of the earlier data of Pearl and Parshley were to be regarded as unsoundly based on insufficient statistics, and the relation of time of service and sex as purely accidental and not significant. It is impracticable for private breeders accurately to record the beginning of oestrus: the onset of activity of the cow towards the bull cannot be regarded as a trustworthy criterion of the onset of oestrus.

In the case of the rat, if the methods of Long and Evans (1922) and of Slonaker (1924) are employed to detect the onset and progress of the oestrous cycle, it is eminently possible to ensure that coitus shall occur at any particular point during this cycle. In the rat the vagina is moist and of a pinkish colour during the di-oestrous pause of the oestrous cycle. During the phase of pro-oestrus, oestrus, and met-oestrus, on the other hand, the vagina is dry and whitish, and the vaginal lips are more or less swollen. Long and Evans have shown that through the systematic examination of vaginal smears it is possible to follow exactly the course of the oestrous cycle. For purposes of description it was found to be convenient to divide the cycle into stages. In stage 1 the vaginal smear consists solely of medium, uniform sized epithelial cells, whilst the lips of the vagina are somewhat swollen. This stage lasts for ten to fourteen hours. In stage 2 relatively few cornified cells are present in the smear. The vagina is patent and its lips are swollen and of a characteristic purple colour. The onset of this stage is sudden, the change from stage 1 being complete in two to three hours. This stage lasts twelve to thirteen hours, and it, together with the next stage, corresponds to true oestrus. In stage 3 the smear consists of large numbers of cornified cells, many of them cohering to form large clumps. The swelling of the vaginal lips is receding. This stage lasts twelve hours. True oestrus, therefore, occupies some twenty-four to thirty-six hours. In stage 4 leucocytes make their appearance in the smear, which now consists of cornified cells and leucocytes. The lips of the vagina are no

*A paper read in the Section of Obstetrics and Gynaecology at the Annual Meeting of the British Medical Association in Edinburgh, 1927.

longer swollen. This stage lasts four to eight hours. In di-oestrum, lasting fifty to sixty hours, the smear consists of epithelial cells and leucocytes.

Slonaker, using the revolving cage, was able to show that the peak of physical activity of the rat coincided with the cornified cell stage of Long and Evans, and Cooley and Slonaker, employing these methods of estimating the exact stages of the oestrous cycle in the albino rat at which coitus was noted, carried out experiments designed to examine the relation of the time of service during the oestrous cycle and the sex ratio. They found that their results showed no appreciable difference in the sex ratio among offspring of matings during early and late oestrus. A ratio of 114.6 males per 100 females resulted from matings during early oestrus, one of 110.5:100 from those during late oestrus. The difference, though suggestive, is not significant, when the numbers of litters considered are taken into account.

In the human it is now generally accepted that ovulation occurs fourteen to eighteen days after the first appearance of the menses. At the time when most of the data concerning the relation between the time of coitus during the catamenial period and the sex of the child were secured, little or nothing was known concerning the correlation of menstruation and ovulation, and so many of them are not really useful.

The observation that the Jews exhibit a high secondary sex ratio has been explained on the ground that coitus is forbidden during the first week after menstruation, and that the ova are, therefore, overripe and potentially male when fertilized. But Pearl and Salaman (1913) failed to find any evidence that in the human the time of fertilization of the egg relative to the menstrual period had any influence upon the sex ratio among the offspring. There are data, however, which seem to suggest that such a correlation does exist. Both Siegel (1916) and Fürst (1886), for example, found that impregnations during the earlier days of the intermenstrual period yielded an excess of males, whereas later impregnation gave a preponderance of females, though Pryll (1916), on the other hand, did not observe this difference. Their data are tabulated below. Freeborn's (1916) figures show an excess of females in the case of impregnation during the first half of the intermenstrual period, an excess of males from those during the second half. Bolaffio (1922), on the other hand, noted exactly opposite results.

TABLE II.

No of Cases.	1-9 Days after Beginning of Menses.			10-14 Days after Beginning of Menses.			15-22 Days after Beginning of Menses.			Authority.
	♂♂	♀♀	Sex Ratio.	♂♂	♀♀	Sex Ratio.	♂♂	♀♀	Sex Ratio.	
80	37	7	528 : 100	4	9	44 : 100	3	20	15 : 100	Siegel.
193	40	18	222 : 100	23	28	82 : 100	27	33	82 : 100	Fürst.
581	136	111	122 : 100	69	62	111 : 100	71	67	106 : 100	Pryll.

The evidence is distinctly conflicting. Ewart (1922) has pointed out that one source of error common to all the above observations is their neglect of the fact that male foetuses at birth are some five to six days older than female foetuses. Siegel (1921) acknowledges the validity of this criticism, and an examination of his records showed that the average length of gestation of males was 272.6 days, whereas that of females was 267.5 days.

The subject is of such interest that it was thought to be desirable to undertake further experimentation. The albino rat was chosen as experimental material; six males from one and the same litter were used. They belonged to a strain which habitually had given an unexceptional average sex ratio (105.4:100 for a four-year period). One hundred females were used; they all belonged to the same strain as the males, being all related and line bred. The experiment was carried out during the period May to September. The experimental animals were maintained under uniform conditions in the colony house, and the diet was the standard diet given to all the general stock.

The progress of the oestrous cycle was recorded by the method of Long and Evans. A drop of saline was placed on a microscopic slide; a metal spatula, moistened with saline, was inserted 1.5 cm. into the vagina, and the vaginal wall gently scraped. The spatula was then stirred in the drop of saline on the slide and this examined under a low-power microscope.

There are certain matters which have to be borne in mind in experimentation such as this. The older the animal the longer is the oestrous cycle, but oestrus proper is of longer duration in younger females. This usually begins in the late afternoon and continues throughout the night and the earlier part of the following morning. Service near the end of oestrus proper is effected only with difficulty in many instances, the female being at this time unreceptive. Further, the female will on occasion accept the male three to five hours before the oestrous cycle begins, so that it is very necessary to recognize the particular phase of the cycle by means of vaginal smears before coitus is allowed. By service early in oestrus is meant coitus during the first three hours of true oestrus; by later service, coitus during the last three hours of true oestrus, when cornified cells fill the microscopic field.

Fruitful coitus can be recognized by the presence of sperm in the post-coital vaginal smear, by the presence of the bouchon vaginale, and by the increase in weight of the female. She gradually becomes heavier and heavier up to the fiftieth day, and thereafter the further increase in weight is rapid in true pregnancy. Pseudo-pregnancy is not uncommon, however, more particularly in the case of coitus during late oestrus, and is to be recognized by the reappearance of oestrus fifteen days after service.

Allowances have to be made for a possible swing of the sex ratio with the chronological order of the pregnancy. In the case of the human there is clearly a relation between the age of the mother and the number of the pregnancy. Primiparae are usually 20 to 30 years old; second, third, and subsequent pregnancies occur in women over 30. Parkes (1924), for example, has shown that two-thirds of primiparous pregnancies occur in women under 28 years of age, second and third pregnancies occur mainly between the ages 23 and 32, and fourth pregnancies occur between 28 and 37. It is recognized that the sex ratio swings with the chronological order of the pregnancy. It is higher in earlier pregnancies (Newcomb, 1904; Ahlfeld, 1872; Winckel, 1903; Hecker, 1874; Little, 1919). This swing may be related to the number of the pregnancy, to the increased age of the mother, or to both of these factors. Cooley and Slonaker (1925) and King (1915) have shown that this rule of a decreasing sex ratio with increase in the mother's age applies also to the rat, and Copeman and Parsons (1904) have shown that it holds also in the case of the mouse. In the present experiments it was decided, therefore, to consider only the third litter of each of the females. There is a progressive lengthening of the gestation period with succeeding pregnancies in the case of the rat. The second is some eight hours longer than the first, the third some six to twenty-four hours longer than the second. Coitus early in oestrus is associated with a somewhat longer gestation period than coitus late in oestrus, as would be expected, since it involves a longer interval between coitus and fertilization. The results of this experimentation may be tabulated as follows:

TABLE III.

No. of ♀♀	Time of Coitus.	Total Litters.	Pseudo-Pregnancy.	Total Offspring.	Average Litter.	♂♂	♀♀	Sex Ratio.
50	First three hours of oestrus proper	35	15	189	5.4±0.13	98	91	51.84±3.37
50	Last three hours of oestrus proper	28	22	159	5.7±0.12	77	82	48.43±3.37
		63	37	348	5.53	175	173	

The conclusions which emerge from this study—concerned, it is true, with numbers that are much too meagre to be of any real significance—are entirely negative. It must be

remembered that it is wellnigh impossible for any one investigator to conduct experimentation on a sufficiently large scale, and that it is therefore desirable that experiments of this kind should be multiplied so that out of a considerable series adequate data may be secured. So far as they go, the present figures tend to support the contention that the time of service in relation to the oestrous cycle is a factor of no importance in the matter of the determination of sex in the mammal.

Summary.

In an experiment designed to examine the sex ratio among individuals resulting from coitus during the first three hours and during the last three hours of oestrus respectively in the rat, no difference was noted between these two groups.

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DISCUSSION.

Dr. JAMES YOUNG (Edinburgh) thought that it was impossible to discuss Dr. Crew's paper until he had had time to read it and digest it. He looked forward to a further series of investigations by Dr. Crew of an even more complete nature.

The PRESIDENT (Dr. Haig Ferguson) complimented Dr. Crew on his most interesting paper, but was sorry that it should be thought that the male was the product of stale eggs.

Dr. CREW, in reply, thought that obstetricians would not be allowed to plead ignorance of this very important subject much longer. It was not the egg but the sperm which determined the sex, but any abnormality affecting the egg would upset the sex-determining mechanism.

UTERINE FIBROIDS AFTER THE MENOPAUSE.*

BY

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UTERINE fibroids may give rise to symptoms over a wide range of age, but in practice we find that a very large proportion of patients consult us for the first time between the ages of 45 and 50, and if we advise an operation the first inquiry of the patient is the possibility of an early menopause with the probability of cessation of symptoms. Naturally every patient wishes to avoid an operation, and every right-minded surgeon wishes to save her this ordeal, but he is expected to advocate the best method of treatment, and, in giving this opinion, he must not allow his judgement to be unduly biased by sentiment. In deciding for or against operation two important considerations must be borne in mind: first, the fact that with uterine fibroids the menopause is frequently delayed; and secondly, the possibility of malignant and degenerative changes occurring in the fibroids after the menopause. It is the second consideration with which I wish specially to deal.

The more experience I obtain in my work the more impressed am I with the serious complications which may occur in connexion with these tumours after the menopause. It is impossible to calculate the percentage of fibroids after the menopause which undergo serious changes, since we only see those patients in whom the fibroid is giving trouble; but, even if the percentage is small, we must give due weight to the fact that the removal of fibroids in a comparatively healthy woman before the age of 50 presents a very slight risk, whereas the same operation in a patient over 60, or still more over 70 years of age, for a fibroid which has undergone degenerative changes from which the patient's general health has suffered, is a very much more serious matter. My own belief is that a patient with a fibroid of moderate or large size will act more wisely in getting rid of it while in a good state of health than in running the risk of serious trouble developing at a later stage of life.

During the last six and a half years I have operated upon 62 patients for definite symptoms due to uterine fibroids after the menopause, and should have operated upon three others if their general condition would have permitted it; it is upon these 65 cases that I base this paper. During this same period I have been consulted by several patients in whom the fibroid was so small and the symptoms so slight that I have advised against operation; these cases are not considered. The majority of these 65 patients were between the ages of 50 and 60, but 8 were between 60 and 70 years of age, and 3 were over 70. In several instances patients complained of two symptoms, either of which was sufficiently severe to call for operation, so in discussing these symptoms separately these patients will appear in both sections.

General Ill Health: Patient not Fit for Operation.

There were three patients whose general health precluded the possibility of operation. One was 60 years of age, with recent haemorrhage from the tumour, but she had had a recent stroke, and even if the tumour proved to be malignant I did not feel justified in subjecting her to any operation. The second was also 60 years of age, and had severe pain in the lower abdomen, apparently arising from a uterine fibroid; but she was in a very feeble state of health with mitral regurgitation, and was not fit for an abdominal section. The third was an enfeebled woman, aged 72, with a fibroid almost filling the pelvis and with a slight degree of prolapse. Many years previously she was told she had a fibroid, but was advised not to have it removed. With advancing years the tumour dropped into the pelvis and produced more and more discomfort from pressure symptoms, and now she is a confirmed invalid, spending most of her life in bed or on the couch, and

* A paper read in the Section of Obstetrics and Gynaecology at the Annual Meeting of the British Medical Association, Edinburgh, 1927.

though possessed of all that wealth can give her, she drags out a miserable existence. Here, again, her general health precludes all possibility of operation, but if this had been performed twenty years ago she would now have been a healthy old lady, enjoying life, and a source of much greater happiness to herself and her family.

Malignancy.

There is considerable divergence of opinion about the incidence of malignant disease in uterine fibroids, but I think all will agree that a uterus which contains fibroids is much more likely to undergo malignant changes than one which is free from these tumours. I am convinced that the risk of this occurring in a fibroid uterus after the menopause is to be borne in mind when deciding for or against operation. In this series of 65 cases 6 had definite malignant changes in the uterus—3 sarcoma and 3 adenocarcinoma. Their ages varied from 49 to 56 years, and they had all passed the menopause several years.

The patient aged 49 years had an interesting history. Double oöphorectomy was performed six years previously for haemorrhage due to a fibroid uterus; she was brought to me on account of recurrent haemorrhages and a thin watery discharge of almost one year's duration after five years' amenorrhoea. I found the cervix dilated by what I thought to be a fibroid polypus. I performed a panhysterectomy and found the fibroid polypus to be a sarcoma. The patient died of recurrence about four months later.

Sarcoma of uterine fibroids occurs much less frequently than does carcinoma of the body or cervix in uteri with fibroids, and it is curious to find in this small series that the two types of growth were present in equal numbers. If I investigated the figures over a longer period of years I am sure the proportion would be different.

Haemorrhage after the Menopause without Malignant Changes.

This is by far the commonest symptom, and in this series 24 complained of bleeding which commenced some time after the menopause; in 6 cases this was associated with other symptoms, which are mentioned in succeeding paragraphs. These patients varied in age from 47 to 68 years. The usual history was simply recommencement of bleeding after a number of years of amenorrhoea, and, as the only physical sign was enlargement of the uterine body with the fibroid, it was impossible to say whether that fibroid was undergoing malignant change or not, unless the patient was anaethetized and a diagnostic curetting was performed. In these cases I do not think that this would be good treatment, since an early adenocarcinoma is easily overlooked, while a sarcoma cannot usually be detected; moreover, a uterine fibroid which becomes active after the menopause, and produces haemorrhage, is not likely to be benefited by curetting, and is much better removed.

Acute Pain.

Nine patients complained of acute pain in the lower abdomen; in two this was associated with haemorrhage and in one with rapid enlargement. All these tumours showed advanced degenerative changes, two with red degeneration, while two had a subperitoneal fibroid with twisted pedicle. In each case the pain was acute and called for early operation.

Chronic Pain.

Some patients complained chiefly of this symptom, principally in the lower abdomen and back, and, in some cases, radiating down into the leg. These patients, on the average, were older than those in the preceding group; in the majority of cases, no doubt, the fibroid had diminished in size since the menopause, and was producing symptoms by pressure inside the pelvis. Three of these patients complained of other symptoms in addition to this chronic pain, but in all this symptom was of such severity that they desired operative treatment, even though one was 72 years of age.

Torsion of the Uterus.

This is a very rare complication, but by a curious coincidence I have had two cases within six months, and it is worth giving a short note of each, as they illustrate different types of onset, one acute, the other subacute.

The first patient, an unmarried woman aged 70, passed the menopause when she was 56, and was told before this age that she had a fibroid, but was advised not to have it removed. For sixteen months there had been recurrent attacks of abdominal pain with sickness, and on this occasion she consulted her own doctor, who found a hard, tender tumour, which the patient said had increased in size. This tumour extended up to the umbilicus and was so tender that I made a diagnosis of red degeneration. On opening the abdomen I found the uterus contained an interstitial fibroid at the fundus, about the size of a foetal head, and that the uterus, with its broad ligament, tubes, and ovaries, had twisted round in two complete circles at the level of the internal os, where they were attached to the cervix by a pedicle no thicker than my first finger. The uterus, tumour, and appendages were deep purple, almost black, in colour, and were easily removed by cutting through this small pedicle. In spite of her age and the severity of the condition the patient made an uninterrupted recovery.

This is a curious case, as there was no history of acute onset, merely recurrent attacks of abdominal pain and sickness extending over sixteen months, and this last attack was little if any more severe than her previous attacks from which she had recovered.

The second patient, also unmarried, was 56 years of age, and had passed the menopause two years previously. When I saw her there had been severe abdominal pain for two days, which was made much worse by her journey to see me; she was so ill that I sent her at once into a nursing home. As in the last case this patient had a hard, tender mass arising from the pelvis to the level of the umbilicus, and I found when the abdomen was opened that she also had a single interstitial fibroid, the size of a foetal head, developed in the fundus. The uterus, fibroid, broad ligaments, and tubes were greatly distended and almost black in colour; they were twisted round in one complete circle at the level of the internal os. The tumour was easily removed, and the patient made an uninterrupted recovery.

Torsion of the Pedicle of Subperitoneal Fibroids.

Two patients, one aged 53, the other 54, were operated upon several years after the menopause for acute abdominal pain due to a subperitoneal fibroid with torsion of its pedicle.

Pressure Symptoms.

Uterine fibroids, after the menopause, shrink in some cases sufficiently far to allow the tumour to fall into the pelvis and so produce pressure symptoms, which may manifest themselves in various ways:

Retention of Urine.—Four patients suffered from acute retention of urine which had required the passage of a catheter. In all cases the fibroid was well down in the pelvis, and no doubt before the menopause it had been of sufficient size to be held above the pelvic brim.

Pressure on Rectum.—Two patients complained of severe rectal symptoms, which had commenced some years after the menopause, and in each case there was a uterine fibroid lying in the pelvis and pressing on the rectum.

Bearing Down.—Two patients complained chiefly of this symptom, though in one case there was also severe flooding. Both patients had passed the menopause several years and the symptoms had only occurred after this period. In these cases no doubt the symptoms were directly due to the post-menopausal shrinkage of the tumour, which allowed it to fall to the bottom of the pelvis.

Sometimes after the menopause the tumour increases in size, and this also may produce pressure symptoms.

Frequent Micturition.—Two patients complained of this symptom. In one the tumour extended almost to the sternum and was very soft, evidently undergoing degenerative changes, whilst the other was smaller in size but extended into the abdomen, and, in addition, was giving rise to much aching, dragging pain.

Swollen Legs.—One patient complained of swollen legs, and had a large, soft fibroid extending up to the umbilicus which was enlarging rapidly.

Increased Size of Tumour.

Nine patients had noticed recent rapid increase in size of the tumour. Several years had passed since the menopause, and the increase in size was due in each case to degeneration of the tumour, usually cystic in nature. The rapid increase in the size of the tumour was accompanied by haemorrhage in two cases and by pain in three.

Degeneration Followed by Infection.

It is to be expected that a fibroid which has undergone degenerative changes would readily become infected, and this is a danger to keep in mind; but in this series I have only one patient who had a rise of temperature before operation. In this instance the fibroid had undergone red degeneration—a type which readily becomes infected. Probably the small incidence of this complication is due to the degeneration producing other symptoms which called for operation before the tumour had time to become infected.

Absorption from Degenerated Fibroids.

This is a very common occurrence. In this series I have three patients who were operated upon for this cause alone, though no doubt many of the other patients were suffering from absorption in addition to the more urgent symptoms which called for operation. Each of these patients suffered in general health—loss of appetite and loss of weight, and they were anaemic. All had degenerating fibroids and improved in general health after removal of these tumours.

Ascites due to Calcareous Degeneration.

This is a condition I have met with occasionally, and though it does not occur in this series should be mentioned. Occasionally in a patient with ascites there can be felt a hard tumour of pelvic origin, which is diagnosed as a malignant ovarian tumour, but proves to be a subperitoneal uterine fibroid which has undergone calcareous degeneration, and by its hardness has so irritated the peritoneum as to produce ascites.

Tenderness after Radium.

A patient, aged 52, had been treated by radium two and a half years previously for haemorrhage due to uterine fibroids. Since this treatment she had complete amenorrhoea, but complained of severe pain in three abdominal scars due to radium burns, and great tenderness in the uterus, which produced severe dyspareunia. The uterine fibroid was quite small and I did not advise any operation; but I think the case should be mentioned to illustrate the fact that treatment by radium, so strongly advocated by some authorities, is not entirely devoid of risk.

This is my experience of post-menopausal trouble from uterine fibroids during the last six and a half years—on the average ten cases each year sufficiently severe to require operative intervention. The number may not seem very large, but when we consider the increased risk of the operation in patients of advanced age, with resistance still further reduced by changes in these tumours, I do feel that this should have considerable weight with us when deciding whether a patient with a fibroid uterus before the menopause should be advised to have it removed. I give it as my considered opinion that it is much safer for a woman with a fibroid of moderate or large size (quite apart from any symptoms it may be producing at the time) to have it removed before the menopause than to run the risk of malignant or degenerative changes, which so frequently occur after the menopause.

DISCUSSION.

Dr. BETHEL SOLOMONS (Dublin) was struck by the large percentage of malignant changes in Professor Shaw's series, which seemed to show that those who favoured the treatment of fibroids by *x* rays were acting on the wrong lines. Whereas in many cases after the menopause hysterectomy was no doubt the best operation, he thought that in isolated instances myomectomy might be preferable. He warmly advocated the use of stovaine in these cases.

Professor LOUISE MCILROY (London) agreed with what had been said; she was convinced that fibroids were caused by toxaemia. She related the case of a submucous fibroid in an enfeebled patient being successfully treated by pituitary extract, quinine, and castor oil, as for the induction of labour.

Professor GIBBON FITZGIBBON (Dublin) was inclined to think that some of these cases were of actual post-menopausal growth, and not necessarily changes in fibroids. It was worth remembering that many women aged from 38 to 40 might nowadays get married, and it was therefore a question whether they should postpone an operation until after the child-bearing age.

Dr. W. FORDYCE (Edinburgh) questioned whether malignant changes were generally so common as Professor Fletcher Shaw's figures suggested. His own experience of fibroids undergoing malignant changes was so limited that the risk might almost be ignored. If malignancy was so common, then operation should be performed for small fibroids and not reserved only for large ones.

Dr. J. YOUNG (Edinburgh) thought that only a very small proportion of fibroids underwent malignant changes after the menopause. He also was strongly in favour of spinal anaesthesia in old and feeble patients.

Dr. J. H. FERGUSON (Edinburgh) had seen three cases of torsion of subperitoneal fibroids and three cases of torsion of the uterus itself. One of the complications of torsion was collapse from haemorrhage.

Professor FLETCHER SHAW, in reply, expressed surprise at the unanimity of those taking part in the discussion. In regard to the occurrence of malignant degeneration in fibroids, it was a very vexed question how frequently this occurred. Statistics varied enormously. His own impression was that a fibroid uterus was much more likely to undergo malignant changes than a non-fibroid uterus. He was not so convinced that malignant change was so common that every fibroid should be removed, but he thought it warranted operation in the case of the larger fibroids. In regard to anaesthesia, he agreed that the spinal method was the most suitable unless the services of an artist in general anaesthesia were available.

SOME POINTS IN THE TECHNIQUE OF THE LOWER SEGMENT CAESAREAN OPERATION.*

BY

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THE lower segment Caesarean operation is such a valuable procedure that it is necessary to bring its advantages and disadvantages constantly before the medical profession, especially in view of the fact that it is neither practised nor recommended in some of the larger hospitals which devote themselves to the teaching of students. No more illuminating argument for the advantages in the operation can be brought forward than the change in opinion of that broad-minded and brilliant obstetrician Munro Kerr, who, in his *Operative Midwifery* (1916) stated that he believed that it would entirely disappear and be forgotten unless the cicatrix in the lower segment was decidedly stronger than the one situated in the upper part of the body of the uterus. He is now well known as a strong supporter of the low segment operation.[1]

It is necessary to discuss various points in technique as they arise, in order that some definite mode of performing the operation may be standardized to some extent.

One of the most instructive communications in recent years is the paper by Harris and Brown on the bacterial contents of the uterus.[2] They show in this that the classical operation is the safest when performed at the time of election, and that the bacterial content of the uterus becomes greater and advances higher the longer the woman is in labour. This might appear at first reading to be a reason for the adoption of the classical operation, but a moment's thought will dismiss this fallacious idea from the mind; for no matter in what part of the uterus the infection lies, be it high or low, it is obvious that the incision should be in the comparatively innocuous lower segment covered with bladder peritoneum rather than in the upper abdomen in close proximity to the intestines, with the likelihood of general peritonitis. These remarks apply particularly to placenta praevia. In this short series a central insertion of the placenta was

* A paper read in the Section of Obstetrics and Gynaecology at the Annual Meeting of the British Medical Association, Edinburgh, 1927.

present on one occasion. The patient was an elderly primipara most anxious for a living child; section was entirely successful with a non-morbid puerperium. It is the operation of choice in this type of case, and the lower segment is the site of the incision, for the reasons stated above. In fact, unless statistics of the classical operation in potentially infected cases can be brought forward to disprove these ideas, the lower segment must be chosen as the operation *par excellence*.

It is not intended to delve fully into the indications; let it be sufficient to state that it should be performed for the patient who has been in labour for some time, who does not appear likely to deliver herself of a living child either naturally or with the help of forceps, and in whom the conditions necessary for pubiotomy are not present. It allows induction with subsequent trial of labour, with the definite knowledge that should the diagnosis prove to be incorrect and the disproportion be too great to permit the head to mould and pass through with the birth of a living child, section can be done with comparative safety. As a typical case No. 16 of my series may be mentioned here.

The patient was a primigravida with membranes ruptured three hours before labour pains started. In spite of strong labour, after thirty-one hours the head was still in the superior strait, much moulded, with a large caput succedaneum and the sagittal suture in the transverse diameter. The cervix was half dilated. The temperature and pulse rate were rising gradually, and the foetal heart beat was 180.

On opening the uterus a large quantity of odorous meconium came away. The child, weighing 9 lb. 2 oz., was extracted alive with forceps. This, comparing the size of the child with the menstrual history, was a case of over-carrying.

Exceptions exist to every rule, and an exception must be mentioned. If the patient is in early labour, if the baby is in imminent danger, and if there is no contraindication to the classical operation, it should be performed, for there is no doubt that the infant can be extracted with more speed.

In former days we used to practise the modified Pfannenstiel incision, and, having incised the vesical peritoneum, sutured it to the upper flap of the parietal peritoneum. We did this in one case (No. 3) of the present series, and regretted the time spent—time which is not compensated by any gain in asepsis. This case had been in labour for a week with no advance, and shutting off the peritoneum appeared to be the obvious step.

The table is kept level during the entire operation. The abdomen is opened by a suprapubic mesial incision. A large wipe wrung out in saline is placed on each side to keep back the intestines. Pituitrin 1 c.cm. is injected; this is a good practice, and less haemorrhage has resulted since the injection was given at this stage. The bladder peritoneum is cut across and the bladder is gently wiped down for a very short distance. The uterus is now incised. One of two types of incision is used, depending on the nature of the case. If the head is floating, the semi-elliptical incision, as suggested and practised by Kerr, Hendry, Holland, and others, is employed. This is a great advance on the straight transverse incision; while it ensures being in the lower segment it saves the necessity for much, if any, pushing down of the bladder, with consequent haemorrhage from pre-vesical veins. If, however, the head is inclined to fix in the superior strait—that is, if the greatest diameter would not get through the brim but is partly fixed—a longitudinal incision is used, and makes for facility. It has the disadvantage that the bladder must be pushed down, but it has a very real advantage in that the head can be handled more easily. With this incision the delivery is effected with forceps; one blade has been tried, but the whole instrument is preferred. When the head is under the hand—that is, floating—it is easily removed, either by pressure from the fundus alone or combined with pressure from under the uterus, or by placing a finger in the mouth.

Some authorities have suggested the possibility of dropping the cord back into the uterus after separation, and expressing it into the vagina; this does not appear to be reasonable. The uterus is open, the infected cord has been out of the uterus; why not take the obvious and quick method of expressing into the incision, and making sure of its speedy departure? In addition, the suturing will be more difficult, and the possibility of an adherent placenta with necessary manual removal at the completion of the operation will increase its dangers.

In one of our cases (No. 6) the head was in the right iliac fossa. On opening the uterus it appeared simple to bring it over to the uterine incision; this was found to be impossible, and it was necessary to perform version and deliver as a breech in order to effect delivery. If a breech presents it is delivered by traction on the leg.

In suturing the uterus a word of warning must be uttered. The inferior edge of the incision is liable to retract, and it is quite possible, if this edge is not clearly defined, to suture the superior edge to the posterior uterine wall; this may sound impossible to some, but it is an eventuality which is possible if care be not taken.

The suture material has been the bane of many obstetricians. The material and method used at the Rotunda Hospital is as follows. Catgut is used all through. It is sterilized as follows: Having been wound loosely on glass reels and dehydrated by soaking in absolute alcohol for three days, it is transferred to fresh alcohol for three days more. It is then placed in Jellett's brass box, which is half filled with absolute alcohol, and the cover is screwed on tightly; the sterilizer is then placed in a saucepan of cold water, which is brought to the boil and kept so for thirty minutes. When cold the catgut is removed and stored in one part iodine solution in fifteen parts methylated spirits.

Two Guy stitches are placed in each angle, passing through all coats. A continuous suture of No. 5 catgut then embraces the endometrium and the deep part of the muscle layer; a continuous second suture of the same material encloses the other parts of the muscle. Finally, a third continuous suture brings the peritoneum over the scar. Continuous sutures are quicker and just as effective as interrupted stitches, and they do not cause gangrene of the tissues. This has been proved to our complete satisfaction in the operation of trachelorrhaphy, where the method of continuous suture is always used. The strength of the scar following the adoption of this method has yet to be proved.

The question of drainage is a very important matter for consideration. The best dictum is—when in doubt, drain; a drain can do no harm in doubtful cases, but its absence may be harmful. This is best established by cases 2 and 5.

Case 2 was a pre-eclamptic, with a generally contracted pelvis with marked transverse narrowing, the measurements being 23½, 26½, 18, 9.2, and 10.3 inches. There was no advance in labour after twenty-four hours. On opening the abdomen there was excessive free fluid, and when the uterus was incised stinking liquor amnii and foul-smelling meconium came away. This patient had a very stormy puerperium; the wound broke down and was resutured. With the help of serum, collosol iodine, pituitrin, and abdominal drainage, she recovered. Had she been drained in the first instance her puerperium would probably have been without incident.

Case 5 was admitted to the hospital from the country after three days' labour. The os was closed, meconium was coming away, the foetal heart beat was 168, and there were tumultuous movements. The head was high above the brim. The condition of affairs on opening the abdomen was similar to that present in Case 2. The abdomen was drained by means of a tube in Douglas's cul-de-sac, and the abdominal wound was drained by means of fine rubber tubing placed in the subcutaneous tissue along the whole length of the wound. The convalescence was uneventful in every way.

Drainage in suspicious cases is a most important asset. The low Caesarean operation can be performed with safety where craniotomy on the living child might be an alternative; drainage puts another weapon in our hands.

In a short communication of this kind no effort will be made to bring forward statistics as a proof of anything. There are included only those cases which have been under my personal care at the Rotunda Hospital since November last. A table is appended giving details of the 18 cases, in which there was no maternal or foetal mortality.

In the series there were 17 cases of disproportion, in 15 of which there was diminution in the pelvic measurements, while 2 were women with definite disproportion without apparent alteration in the diameters of the pelvis. The case of central placenta praevia in a primipara aged 39 has been referred to already.

Of the 18 patients 10 were primigravidae and 8 were

No.	Date.	Age.	Para.	Measurements (inches).					Weight of Infant.	Days in Hospital.	Notes of Cases.
				I.Sp.	I.C.	E.C.	C.V.	Trans.			
1	18/11/26	28	II	24.5	27.5	16.5	8.5	11.5	5 lb. 10 oz.	17	First child forceps, died at birth. Long labour with early rupture of membranes. Slightly morbid. No uterine cause discoverable.
2	19/11/26	22	I	23.5	26.5	18	9.2	10.3	7 lb. 1 oz.	57	A very difficult case, some details of which are given in the text. Very long labour with much moulding. No advance. Hyperflexion. Much free fluid and stinking liquor amnii. Discharged fifty-seventh day.
3	24/11/26	30	II						6 lb. 5 oz.	18	First labour symphysiotomy with stillborn child. Admitted with membranes gone for a week. Head above brim. No question of necessity for section. No internal pelvimetry done. Head much moulded. Approximation of parietal visceral layers. Morbid.
4	5/12/26	36	I	26	28.5	20	9	9.8	7 lb. 8 oz.	14	Head quite free after rupture of membranes.
5	7/12/26	29	I	28.25	29	18.5			8 lb. 6½ oz.	16	Admitted from country. In labour three days there with membranes ruptured. Abdomen overstretched. Head unfixed. Meconium coming away. Foetal heart 168. Os one finger. Liquor amnii and meconium stinking, so abdomen drained. Uneventful puerperium.
6	27/12/26	30	III	28.25	30	19.25	7.8	—	8 lb. 14 oz.	16	Previous labours: (1) stillborn after 48 hours; (2) stillborn after 36 hours. Head transverse: version after section. Further details in text.
7	23/1/27	28	I	23.5	27.5	20.5			8 lb. 6 oz.	14	In labour two days at least with membranes ruptured and head high. Foetal heart over 160 continuously.
8	28/1/27	25	I	25	27	20	9.7	—	7 lb. 8 oz.	14	After labour. No advance of very hard head which remained above brim. Os two fingers.
9	28/1/27	36	I	25	27	20	8	—	5 lb. 6 oz.	22	On admission head high. Os 1 finger. Cervix applied. No advance. Cervix oedematous. Hyperflexion. Moulding. Morbid. Pneumonia.
10	8/2/27	22	II	24.5	27.5	19	10.7	11.4	8 lb. 10 oz.	14	Brought from country. Large abdomen. Brow presenting. Blood-stained liquor amnii. Intense moulding. No chance of changing presentation.
11	15/3/27	23	I	26	26	19			8 lb. 14 oz.	14	Long labour four and a half days with no sign of largest diameter coming through superior strait. Much moulding.
12	15/3/27	24	I	28	29.5	19	9.4		8 lb. 14 oz.	14	Breech originally—turned by external version. Müller at 36 weeks did not indicate induction.
13	2/5/27	26	VI	25	27	17	—	—	7 lb. 15 oz.	14	Fundus distinct with high head. Very bad history. Prolapse of cord and inertia in last confinement. Patient a week over term. Temperature 101°. Bandl's ring high up. Head presenting asynclitic.
14	6/5/27	39	I	—	—	—	—	—	7 lb. 7½ oz.	13	Central placenta praevia. Details in text.
15	25/5/27	34	V	24	26	20	7.5	11	6 lb. 5½ oz.	13	Previous labours: (1) stillborn; (2) perforation; (3) pubiotomy; (4) classical section. Admitted with membranes ruptured. Meconium coming away. Foetal heart 112.
16	15/5/27	24	I	25	28	21			9 lb. 2 oz.	19	Disproportion, over term four weeks. Trial of labour for 26 hours after membranes had ruptured resulted in one-third dilated os. Five hours more gave no advance. Temperature and pulse raised. Uterus rather tonic. Foetal heart 180. Moulding, caput, hyperflexion. Head in upper strait. Lower segment very thin. Smelly liquor amnii. Drainage with one tube.
17	28/6/27	34	III	25.5	27.5	16.5			7 lb. 8 oz.		First labour, baby 5½ lb. which died with denting of skull over both parietals. Second labour, 6 lb. 11 oz.; classical section. Third labour, admitted with ruptured membranes, head quite free; good labour; no advance.
18	3/7/27	39	II	25	26	17.5	9.5	10.5	8 lb. 7 oz.		First labour, perforation. Seen a week before labour on this occasion—too much risk in induction. Decided to give trial. Head quite free above brim. No advance with labour.

multiparae; of the latter, No. 1 had had a baby which died at birth after a difficult labour; No. 6 had two stillborn children after forty-eight and thirty-six hours respectively; No. 15 was a 5-para, whose four previous labours had resulted respectively in stillbirth with forceps, perforation, pubiotomy, and classical section. The low segment is particularly suitable for this type of case, especially when adhesions are present around the old scar, or when there is a history of infection in the previous labour—an incision in the uterine scar in these circumstances might light up an old infection—apart from this it seemed only fair to let her have variety. No. 17 was a 3-para. The first child was born with dents on both parietal bones; the second labour terminated in a classical Caesarean section.

Nothing special need be said of the other cases, details of which are given in the table, beyond the fact that all of them were given a trial of labour and that delivery *per vias naturales* was obviously impossible; in fact, there have been two or three women with stillborn babies who might have benefited by the operation.

The lower segment operation has now come to stay, and credit must be given not only to the workers of the present day, but to those of decades back whose names have been extolled in the historic paper by De Lee.[3]

Conclusions.

1. In view of the fact that proof has been brought forward that the longer labour lasts the higher will be the bacterial content of the uterus, the lower segment operation is the choice where section is indicated for patients in labour.

2. It is indicated for placenta praevia in selected cases. The lower segment is preferred to the upper, because a scar covered by peritoneum is less likely to lead to infection in the general peritoneal cavity.

3. The lower segment operation allows a trial of labour.

4. The incision in the uterus should be longitudinal or elliptical, depending on the position of the head.

5. The placenta should be delivered through the uterine incision in all cases.

6. Suture of the uterine incision by two layers of continuous catgut sterilized by the alcohol-iodine method has been attended by immediate post-operative success; the remote results have yet to be ascertained.

7. Drainage of the abdomen for forty-eight hours should be performed in all suspicious cases.

REFERENCES.

[1] Munro Kerr: *Amer. Journ. Obstet. and Gynecol.*, xii, 729. [2] Harris and Brown: *Amer. Journ. Obstet.*, xiii, 2, 133. [3] De Lee: *Amer. Journ. Obstet. and Gynecol.*, x, 103.

DISCUSSION.

Professor GIBBON FITZGIBBON (Dublin) stated that he had given both the classical and the lower segment operation a trial. He was strongly in favour of the lower segment operation, since it gave them an opportunity for a trial labour. It was not an easy operation, either before the onset of labour, or early in labour before the lower segment had become properly differentiated and was well on the stretch. His practice was to deliver the placenta through the wound.

Professor McIlwraith (Toronto) said that the lower segment operation was gaining in favour in Canada. They did not employ low section in placenta praevia or in cases where it was to be expected that the patient would go through a subsequent natural labour. He described a case in which the classical section had been performed when in a later pregnancy; rupture occurred, not through the uterine scar, but through the lower segment.

Professor Hendry (Glasgow) welcomed the emphasis that had been laid on the opportunity for a trial labour which this operation offered. He did not think it was a good operation for placenta praevia, and he left the placenta inside as a general rule. He always used continuous catgut sutures, and had never found any necessity to drain.

Dr. J. H. Ferguson (Edinburgh) referred to the methods of sterilizing catgut, particularly the length of time required for each size.

Dr. Solomons, in reply, said that he found it difficult to say what size of catgut he used, as different makers seemed to employ different standards. Roughly speaking, the thicker the gut the longer it was left in the box. In spite of what others might say to the contrary, he would continue to drain when in doubt. His objection to leaving the placenta behind was that cases might arise when it was necessary to explore for it, and this would add enormously to the risks of the operation.

THE UNIFICATION OF LOCAL HEALTH SERVICES.

I.—THE WORK OF A LOCAL HEALTH AUTHORITY.*

BY

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The administration of the health services of the country is admittedly defective, and there is a general consensus of opinion that the time for unification is becoming ripe, although the precise method of accomplishing this and the difficulties surrounding it are still subjects of controversy. The defects which are to-day under criticism are very largely the product of the historical evolution of local government. The tendency of administration hitherto has been to create from time to time special local bodies responsible for the conduct of particular services wherever these could be organized as separately functioning independent units. It is not necessary to enter into the reasons for this multiplicity of services and the hesitancy to face the problems of unification. Modern ideas are causing the whole complicated structure to be regarded as somewhat of an anachronism. The essentials of successful administration of the health services are now perceived to lie more in the direction of interdependence than of independence, and the phraseology in common use includes the terms co-ordination and co-operation, if not actual unification.

The various administrative bodies concerned in the treatment and prevention of disease now find themselves exposed to the atmosphere of modern thought. Their continued separation and isolation are becoming more and more subject to criticism. The nature of the functions they perform can no longer be regarded as falling into watertight compartments. A rigid separation between curative and preventive medicine can no longer be maintained as a working proposition.

The confusion has been still further augmented by the rapidly increasing responsibilities thrown upon local public health administration in recent years. Public health laws and regulations have followed one another in breathless haste, and bodies created for simple purposes now find themselves endowed with immense and complicated statutory functions. While larger local authorities have been able to absorb and apply these measures, the rapid growth in the scope of health services has raised acutely the question of the power of small authorities (apart altogether from considerations of capacity) to function efficiently, and many have indeed passed beyond this stage. It is quite clear and well recognized that efficiency, at least as regards major services, is proportional to the size of the area administered, its population, and rateable value. This question of the size of the unit of administration lies at the root of the problem, and is one of the reasons which have caused the whole structure of local government—its merits and demerits—to be reviewed in recent years from many angles. The determination of what is to be regarded as a suitable area for local administration is a difficult but fundamental problem. The anomalies connected with the health services have become most apparent, and have helped to point the moral.

A brief summary may be given of the conceptions which have occurred to various reformers as contained in the results of the inquiries which have been conducted by, or on behalf of, the Government. All have recommended unification more or less strongly.

The Local Government Committee, known as the MacLean Committee, 1918, recommended the abolition of the Poor Law and the merging of its functions in those of local authorities. It appears to be the declared intention of the Government to introduce a bill to give effect to this proposal. From the public health standpoint this would mean that the medical functions of the local authority and the Poor Law authority would completely coalesce. It is interesting to observe the views then held by the late Sir Robert Morant, at that time permanent secretary to the Local Government Board. Looking far beyond the terms of reference to this committee, he signed the report on the following assumptions:

> "I assume that before transference takes place the necessary extension by Parliament and by the Government departments of the various Acts and arrangements relating to the health of the people shall have been completed, on broad comprehensive lines, for securing the provision in all localities of public services designed to prevent, at least as much as to cure or to mitigate, all forms of ill health and disease; such various functions, where they are shared between two local bodies, to be exercised by them in the closest organic co-operation with one another, by interlocking representation of each on the other and by dovetailed schemes of work."

The Royal Commission on National Health Insurance, with commendable courage, recommended that "Insurance Committees be abolished and their powers and duties transferred to appropriate local authorities." This proposal would, if carried into effect, do more than fulfil their other recommendations, that the continually expanding medical services should be maintained in close relationship both at the centre and in their local administration, and that, in considering any changes or developments in the insurance medical services, regard should always be had to the importance of the fullest possible co-ordination with other health services. The preamble to the Insurance Act states that it is an Act for the *prevention* and cure of disease. Regarding maternity benefit from this point of view, it is clear that a sound insurance scheme should concern itself with the introduction of competent midwifery into the homes of the beneficiaries, if it is to be truly preventive. But a service of this kind is a function of the local health authority, and it is obviously anomalous that the latter should be endeavouring to cover the whole ground, while the former is dealing with the problem partially and imperfectly. No doubt such considerations led the Commission to say that the service element should be administered by the local health authorities.

The Consultative Council on Medical and Allied Services in England (1920) propounded a comprehensive scheme for the systematized application of medical and allied services, which need not be given in detail. In the report the following remarks occur: "Preventive and curative medicine cannot be separated on any sound principle." "The organization of preventive medicine has become insufficient because it fails to bring the advantages of medical knowledge adequately within reach of the people." The Welsh Consultative Council (1920) propounded a somewhat

* A paper read in the Section of Preventive Medicine at the Annual Meeting of the British Medical Association at Edinburgh in opening a discussion entitled "Should all public health administration be concentrated under a single department, and the immediate control in each executive area be vested in a single individual?"

similar scheme, which embodied the following: "The Council have no hesitation in recommending that the future provision for the health of the people in Wales should be approached from the preventive side." The proposals contained in these reports amounted to complete reconstruction from the foundation. They were both iconoclastic and reconstructive. They made no attempt to pour new wine into old bottles, feeling, no doubt, that the old bottles were only fit for the scrap-heap. It is very doubtful whether legislation is likely to proceed in this country along such drastic lines. For our purposes, however, it is important to note the view that all services, curative and preventive, should be brought together in close co-ordination under a single health authority for each area.

As regards Scotland, the first recommendation of the Consultative Council (1920) was: "Unification of the various local authorities concerned with health is urgently necessary as the next step on the way to the systematic organization of medical services throughout the country." Their second recommendation was: "A complete and adequate medical service should be brought within the reach of every member of the community"—a view which led them to the logical conclusion that "medical benefit should be extended to dependants of insured persons," so as to secure a sound foundation on which to erect a complete medical service.

Recognizing that the application of convictions, however sound, would require to be brought into line with the scope and problems of local government, the Scottish Board of Health appointed a Consultative Council on a Reformed Local Authority for Health and Public Assistance, which reported in 1923, having investigated the problem of local government in great detail. The difficulties of and the need for reform were succinctly expressed as follows:

"(*a*) The overlapping and waste due to the distribution of the local administration of the health services among several different authorities in each area; and (*b*) the fact that many of the administrative units are too small to carry out efficiently the powers and duties laid upon them by Parliament."

While town councils, county councils, and district committees carry on the general public health services in their areas, other authorities administer in the same areas special health services for particular sections of the population; for instance, the Insurance Committee for insured persons; the education authority for school children; the Poor Law authority; the District Board of Control for the insane and mentally defective poor; and the local War Pensions Committee for disabled ex-service men. The two main recommendations of the Council were:

"(1) The concentration of all health services in one local authority, if possible for each area, should be the immediate aim of reform; and (2) the unit of administration should be as far as possible consistent with the Scottish system of local government."

After much discussion, and without complete unanimity, a unit for local health administration was fixed on the basis of a population of 50,000 persons. The report points out that there are in Scotland 201 autonomous burghs, 19 of which have populations under 1,000, 108 between 1,000 and 5,000, 57 between this and 25,000, and 17 with populations over 25,000 persons. It is clear that the smaller the burgh the more top-heavy becomes the administration of public health, which includes such functions as housing and town planning, control of infectious diseases—including tuberculosis—maternity and child welfare, etc. One of the chief criticisms is that they are unable to appoint fully qualified officers and to provide the necessary institutions.

Contiguous to Glasgow there is a small burgh of 25,000 inhabitants, depending for its major public health services on the adjacent city, which undertakes the treatment of its infectious diseases. It would be foolish for this local authority to provide itself at this time of day with institutional accommodation. We need not, however, pursue the question of the appropriate administrative size of communities, or consider the vigour with which objections are being urged, such as doing anything to offend the growing spirit of local government, which unfortunately often takes the form of pride rather than of expediency.

It is, however, becoming clear that for certain special purposes large areas of administration are advisable. The term "regional administration" is now a current one, such as is contemplated in the Electricity Supply Acts. Mr. I. G. Gibbon refers to the Merseyside Municipal Co-ordination Committee, which has been formed by the towns of Liverpool, Birkenhead, Wallasey, and Bootle to provide for common action in some of their problems. Many public health problems could be dealt with similarly; for instance, hospital provision, housing and town planning, smoke abatement, and other matters.

Regional consultation and co-operation is at any rate becoming more and more a factor likely to enhance efficiency. As recent illustrations, I might quote the arrangement reached with certain other local authorities in the neighbourhood of the city, whereby gonorrhoeal ophthalmia and puerperal fever are treated in Glasgow institutions. Both of these affections require skilled attention, and although in the latter case it may be difficult to set aside the necessary accommodation, the principle involved is an eminently sound one. In a similar way orthopaedic work requires a still more involved co-operative system. The treatment of non-pulmonary, or, as it is called, surgical tuberculosis, is best carried out in a large and well equipped institution. Similar considerations apply to the management of the late results of encephalitis lethargica. I have mentioned these points because they are essential to the efficient solution of the growing complexities of public administration.

The question of unification of local medical services may be looked at in the light of the principles underlying the preventive work of a local authority. This has grown up out of small beginnings, the first and sole function being the suppression of nuisances, just as the huge Poor Law system in its modern form grew up out of Poor Law relief. In the course of time there appeared other bodies endowed with medical functions. In this hierarchy of local administration the local authority is now the principal vehicle of health administration, especially on the preventive side. It selects for attention an increasingly large number of diseases, against which administrative measures can have some hope of success, or where, as in the case of pneumonia, measles, and whooping-cough, prompt institutional or other treatment is likely to reduce the consequences to the individual. It administers a large group of laws and regulations dealing with environment. Further, in its maternity and child welfare schemes it selects certain groups of the population for preventive attention, connoted by the term "welfare," a word which quite suitably expresses the modern conception of its functions.

The work of a local authority as regards disease has three guiding principles: (*a*) it selects particular affections, or even stages of an affection, where prompt and suitable treatment may avert consequences to the community or to the individual; (*b*) the completeness with which a preventive field once selected is covered is an element in successful administration; (*c*) the study of environment in relation to disease is one of its prime functions.

No other local body fulfils these functions. The Poor Law authorities in some places—notably in Glasgow—are animated by high ideals. They have found by experience that it pays them to provide the very best treatment for the sick poor at the very earliest stages of their illness. It is one of the criticisms of the Poor Law that so few authorities have realized this. In practice, however, we find that the local authority and the Poor Law authority deal with the same diseases or with different aspects of the same disease. We may even find an ambulance of the local authority removing a patient with pneumonia, and shortly afterwards one from the Poor Law authority removing a patient with pleurisy from the same address. Although there exists very close co-operation, the situation is full of anomalies, and it is more than probable that the total institutional accommodation available in Glasgow—some 5,000 beds belonging to both authorities—could be distributed to better advantage during times of epidemic pressure, were they under unified control.

As regards the medical side of education authorities, here again preventive work reaches a high level; but this remedial work could quite well be extended to children under school age. The more the work of a local authority in its child welfare schemes reaches the child of school age,

the more difficult it is to find any rational basis for separation of function as between the two bodies. A very practical point emerges here. The remedial and preventive work of the local authority and the education authority are so closely dovetailed that the multiplication of clinics by the respective authorities for their own purposes is likely to lead to chaos and extravagance. To mention only one point, the provision by both authorities of dental or ophthalmic or orthopaedic treatment in separate buildings with separate administration, for the same area, is clearly unsound. The question of acute rheumatism and rheumatic heart disease in children is at present receiving much attention, and I confess to being in considerable doubt as to what precisely might be the respective functions of the two authorities when a complete scheme comes to be evolved.

The Insurance Act is an Act for the *prevention* and treatment of disease, and I have already mentioned the recommendation of the Insurance Commission that Insurance Committees should be abolished and their functions transferred to local authorities.

The modern tendency to separate diseases into compartments or specialties in separate institutions is giving rise to much complexity. The same remark applies even more forcibly to the multiplication of clinics for a variety of purposes. It has been found to be administratively convenient to provide clinics for tuberculosis, child welfare, and venereal disease. Remedial clinics for various other purposes are being suggested, while the general and special hospitals have their outdoor departments, as have also the Poor Law authorities on a smaller scale.

I feel quite certain that it will be left to someone some day to bring order out of confusion, and that in each appropriate area there will be established what may be called a health centre, within the walls of which will be combined facilities for the examination and treatment of all patients who may be referred to it for appropriate advice by the medical practitioners in the neighbourhood. The scope of such a centre can be only partially visualized at the moment, because a complete scheme of this kind, to be associated with a really preventive service in which the community and the medical practitioners of the areas could take part, presupposes the extension of medical benefit to dependants, and the unification of all public bodies engaging in medical work under one authority. There would thus remain the public health authority on the one hand, and the voluntary institutions on the other, both co-operating in a common cause. At present we are only partially organized for the proper application of preventive medicine in its best sense.

The whole essence of preventive medicine as applied to the community is the removal of conditions prejudicial to health, whatever these may be—from removal of nuisances to the provision of houses, and from the destruction of rats to a smokeless atmosphere; as applied to the individual, it means the prompt detection and appropriate treatment of defects or diseases; it also implies the maintenance of the health of the individual with his active co-operation, assisted by a knowledge of the laws of health and hygiene. Now this covers a great deal of ground—indeed, the whole province of medicine as applied to the community. Every physician, every volunteer or official body concerned with health, is working within this ground. Preventive and curative medicine are thus proceeding hand-in-hand. The loom of medical science is busy weaving them together, and they will some day emerge completely interwoven without any tears or gaps in the fabric.

II.—THE FACTORY MEDICAL SERVICE.

BY

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The question for discussion, so far as the factory medical service is concerned, is one of immediate practical politics—more so, probably, than for other public health services.

Our code of factory legislation has grown up distinct from other public health Acts, and claims an ancestry dating from 1802. It is administered by a highly skilled expert staff of inspectors, the great majority of whom are not medically qualified. This staff has always formed part of the Home Office, but a transfer to the Ministry of Health would be merely a matter of central office allocation, and would not in any way alter the present direction of factory inspection from Whitehall.

This method of administrative control has been copied for Acts concerned with mines, alkali works, explosive factories, and vivisection—wherever, indeed, technical knowledge is needed over and beyond what may be reasonably acquired in each executive area. It differs essentially from that of the Public Health Acts, which are administered by local executive authorities, advised and assisted, rather than coerced, from Whitehall. Here, however, such problems as those connected with water supply, housing, refuse disposal, and school medical inspection are common to each executive area, and knowledge concerning them may reasonably be acquired in each area.

This difference, however, does not necessarily run counter to the suggestion that locally one single person might control the factory medical service as well as other health services. This suggested control might interlock with an inspectorate centrally controlled; the advantages or disadvantages of the plan must depend on what is meant by factory medical service, now and in the future.

Apart from the cost of the Factory Inspection Department of the Home Office, the cost of all health provision in factories regarding such things as sanitation, cleanliness, overcrowding, ventilation, drainage, lighting, first-aid equipment, cloakrooms, washing facilities, canteens, medical examination of young persons, and the like, is a charge on each particular factory. Each factory is a separate unit within an executive health area, and pays rates to the health authority of that area. The activities of the area health department are financed from the rates; they benefit the whole of the area.

A reason for giving special thought to-day to factory health service is that there is before Parliament a bill for consolidating factory legislation. Such a bill was introduced in 1924 by the Labour Government. In a modified form it has again been introduced by the present Government. The sections concerned with industrial medical service, except for slight differences in drafting, contain the same provisions in both bills; they may, therefore, be regarded as non-controversial.

The provisions in the present bill indicate the scope contemplated for factory medical service. Hence some conclusions may be arrived at as to whether this service should in each executive area be vested in the immediate control of a single individual who also controls municipal, school, and all other public health administration. When considering the provisions of the bill medical service only will be reviewed, although the whole bill may rightly be envisaged as a public health measure.

The first medical provision (sec. 64) is a new one. It confers on the Secretary of State powers to make orders for special medical supervision. The occupier, in order to secure the health of the persons employed, may be required to make reasonable provision by arrangements for the special medical supervision of the workers. The precise way in which this new section will work can hardly be foretold until an order has been made under the proposed powers, but we note that the section contemplates the occupier himself making the provision, not the provision being made for him by some outside authority.

The next medical provisions are concerned with the duties of "appointed doctors," as the certifying factory surgeon of previous Factory Acts and of the Workmen's Compensation Act is now to be called. "Appointed doctor" is defined (sec. 132) to mean a medical practitioner duly appointed to act; and the Secretary of State or chief inspector may appoint (sec. 112) a sufficient number of duly qualified medical practitioners to be appointed doctors for the purposes of the Act, and may revoke any such appointment. The fees to be paid to appointed doctors for carrying out their duties may be determined by the Secretary of State (sec. 113), and must be paid by the occupier if the duty concerns the certification of young persons, or medical examinations called for by regulations made under the Act.

Appointed doctors may be called upon (sec. 64), as heretofore, to investigate special cases of death, injury, or disease, but duties under this section have in the past been unimportant. The main duties, as of old, will be concerned (sec. 86) with the certification of young persons under 16 years of age for factory employment. Here the section contains a new plan in subsection (4) which runs as follows:

"The Secretary of State may, after consultation with the Ministry of Health, by order transfer to the county council the duty of arranging for the medical examination and certification of young persons under the age of 16 years under this section."

This proviso clearly contemplates the local health authority carrying out the duties of appointed doctors. The advisability of such action will be considered later. A further new enactment [sec. 86 (6)] in this connexion is that every local education authority must produce to an appointed doctor, for his confidential information, so much of the school medical record of a young person as may be necessary to enable him to carry out effectively his examination previous to certification. There can be no doubt about the wisdom of this provision.

When the post of appointed doctor, as just outlined, is compared with that of certifying factory surgeon as it at present exists, the posts at first sight seem identical, and there does not appear to be any justification for altering the name which has existed since 1844. Yet the alteration in name cannot be merely the fancy of a drafting clerk. It challenges attention. We find that under codes of regulations applied to certain dangerous trades there have for long existed "appointed surgeons." These doctors, who might or might not be the certifying factory surgeons of the district, have been chosen by the factory to carry out duties required by the regulations, and have been submitted for approval to the chief inspector of factories, who has then appointed them to act.

The work done by these appointed surgeons has always been recognized by the Factory Department to be good; not infrequently employers have extended the duties of the office to wider supervision of health matters than those embodied in the regulations under which the post of appointed doctor has been created. The thought arises, then, that the change of name may contemplate extending this type of appointment in place of appointments made, as now, for whole districts—appointments in which the factories have little to say, but are compelled to accept and to pay. There is nothing in the bill against such contemplated action, and action on such lines may prove to be the foundation of a real factory medical service.

Legislation as just outlined, it is true, does not contemplate a full and wide medical service; it does not stand in its way; but it only provides for the prevention of ill-being among workers. As usual legislation must not be expected to proceed ahead of progress; it can only register good custom and consolidate ground gained. It is a bulwark against backsliding, not a spearhead in advance. But there is a wider and higher factory medical service—that is, the maintenance of health. This service is of direct economic value to wage earners and wage payers; it is this service the community needs and industry requires. It is in the light of initiating such a service that the present discussion should be regarded.

In the past the office of certifying factory surgeon has not led to the evolution of a good factory medical service. What are the possibilities of such a service the United States is exhibiting? Medical examination of all, adults and young persons alike, before engagement; re-examination on return after sick leave; supervision of first aid and of all health hazards; in some cases even the establishment of a polyclinic to advise the home doctor (there are, of course, no panel doctors in the United States), and the provision of rest homes in the country—a voluntary medical service with no legislative enforcement behind it, a service which, while it appeals to humanitarian motives, is recognized as good business. It pays; it reduces labour turnover; it lessens accidents; it minimizes sickness; it increases the quantity and quality of output. Labour is too costly and too scarce in America to be left uncared for, and this care ends in reducing costs of production.

A reason why the office of certifying factory surgeon in the past failed to evolve on American lines may have been that a medical man was thrust upon the industry of a whole district from Whitehall, where also his fees were fixed. The doctor found his fees skimpy and tended to respond with skimpy service. Industry submitted, paid, but saw no reason to extend such service. Once each factory is allowed choice of doctor the picture should alter. In the past dismissal of a certifying factory surgeon for inadequacy has not occurred—how could a Government office dismiss its own nominee (often nominated owing to political influence)? But the office has always felt to be in a stronger position in criticizing the work of appointed surgeons and in insisting upon a high standard of work, and, indeed, has always obtained it.

Each factory is, and should be recognized to be, a unit, possessing its own services for engineering, management, technical production, and medical supervision, all carried on in the interests of trade; just as each local authority possesses its engineers, lawyers, and medical officers for conducting the business of the locality in the interests of its inhabitants.

The Ministry of Health calls for health activities, and then supervises and inspects the activities of the local authorities. The Home Office calls for compliance with the Factory Acts, and then supervises and inspects the compliance accorded by each factory.

Any plan which contemplates a local authority carrying out medical services for a factory seems to be crossing the lines of efficient action. Carry the proposal to its logical conclusion and see the result. The local authority, acting presumably through some extension of its school medical service, would examine and certify young persons for employment, for which purpose a more or less intimate acquaintance with the conditions of local industries would need to be acquired. The occupier would have no say in the medical personnel carrying out the work (which might change frequently), but would have to pay the prescribed fees, and would be no more likely than at present to desire extension of such a service—and it is just this extension which is most needed. But allow that he did desire such extension on lines developing so advantageously in America, how could such service be provided by a county council through its medical staff? Either the occupier would have to engage further medical help to do the rest of the work, a plan which would cut in two and hopelessly spoil his medical service, or the county council would have to set aside whole-time officers to do nothing but factory work, when the only possible reason for the proposed plan—continuation of school medical service—would be lost; and the council would either be providing to the factories a useful service free, or taking fees to pay for the service. But quite likely the occupier would object to paying the fees, on the plea that he already, through the rates, is paying the salary of the medical officers concerned. If his objection were upheld he would receive a service of economic value to his business at the public expense. It would seem to be as reasonable for the county council, because it employs certain engineers, to insist on supplying factories with engineering service. The factories should supply their own medical service.

Maintenance of a good standard of work should certainly be ensured through inspection, by which should be understood the distribution of information, help, and advice, while penal and punitive action is kept in reserve. More and more is this becoming the spirit in which the factory code is administered; it has long been the spirit adopted by the Ministry of Health. A minimum medical service, such as the present factory bill contemplates, may be laid down by law, but industry, under inspection, should then be left to carry it out and develop it. So it may become as full of useful and humane activity as it is certain to be an economic proposition. The experience of the past has shown that a medical service inflicted upon industry may remain over long years futile, ineffective, and incapable of full development.

DISCUSSION.

Professor F. E. WYNNE (M.O.H., Sheffield) said that the proposed unification of these services was only a reversion to the findings of the Royal Commission of 1869. The

wisdom of those findings had never yet been seriously challenged, yet very little had been done in the way of adopting them practically. The Ministry of Health had been formed with a view to such unification of services, yet the health services were still administered centrally by a number of Government departments. He was convinced that there should be one Minister and one department co-ordinating all these services, and local unification and co-ordination would follow. He emphasized the importance of continuity of the health records, or "medical history sheets," of the individual from infancy, through school life, and until the advent of the insurance status. At present the records laboriously kept by different local departments were largely wasted. It was also, he thought, most important that junior medical practitioners entering the public health service should have an opportunity of studying all branches of the service. It was a bad thing for a newly qualified practitioner to be placed in a "compound" where he saw only tuberculosis. That was not the way to learn the diagnosis of tuberculosis. He should have his fair share of clinical work in the isolation hospitals for infectious diseases, and in the maternity and child welfare and the school medical departments, with reasonable opportunities for studying general sanitation and administrative methods, including statistics and finance.

Dr. J. H. Meikle (Edinburgh education authority) defined the position of the school medical service in Scotland, where the local education authority was quite separate from the county or burgh council. In some counties the local medical officer of health was also school medical officer, but this was not the case in other counties and in the larger burghs. Co-operation was, however, promoted by the issue of a memorandum in 1919. In Edinburgh there was regular interchange of information between the medical officer of health and the school medical officer. Dr. Meikle thought that the school medical staff might preferably be controlled by the local education authority, and that the joint use of clinics by the two authorities would be economical.

Professor E. W. Hope (University of Liverpool), in a memorandum which was read by the honorary secretary, explained how the conscientious recognition by various Government departments of their health responsibilities had led to overlapping, duplication, and expense. These departments were naturally reluctant to hand over to a central body duties which were already being efficiently discharged. Moreover, legacies of arrears of work due to the war complicated the situation further. There was still confusion in the definition of the respective scopes of operation of the authorities responsible for dealing with destitution and disease; thus the Poor Law authority was still charged with the administration of vaccination. Artificial and sectional defects minimized efficiency and increased expense. Professor Hope concluded that unification was desirable, and that one chief medical officer might well supervise and guide the activities of a staff engaged in the various administrative details directed towards the prevention of disease.

Dr. F. Dittmar (Scottish Board of Health) said that of late years the large city parishes of Glasgow, Edinburgh, Aberdeen, and Dundee had established hospitals which were comparable with the large voluntary hospitals of those cities. In Glasgow those Poor Law hospitals already had their consulting staffs, medical, surgical and specialist. The time had now come when all work, both in connexion with infectious diseases and general diseases, should be undertaken by the local authority responsible for the administration of public health in its area. This had already been done in Aberdeen, where the city council had, by mutual arrangement, taken over the whole of the Poor Law hospital service. The medical services of local authorities included the general administration of public health, the isolation and treatment of cases of infectious disease, and the administration and treatment of tuberculosis, maternity and child welfare, and venereal diseases. The education authority had its own medical staff, which naturally co-operated with the public health authority. The medical officer of health, who was directly concerned with all questions affecting the health of the community, should be the head of the unified department of public health. In some cases this arrangement was already in force, but in other cases it had not been attained for various reasons, partly financial. Many administrative difficulties could be overcome by enlarging the area of the local authority. In factories the general sanitary and health conditions would naturally be under the general supervision of the medical officer of health, but special medical welfare work should be controlled by the factory concerned. It had already been demonstrated in the United States that such work was in the interests of both employers and employed.

Dr. R. N. K. Menzies (M.O.H. and school medical officer, London County Council) explained the present system of administration of public health in the London area. From this point of view, he said, there were many "Londons." There was the area of the administrative county, the City of London, water London, the Port of London, and twenty-eight metropolitan boroughs, varying in population from 50,000 to 350,000. In addition to these there were the various Poor Law authorities with different boundaries, and the Metropolitan Asylums Board. All these authorities were performing their different but often overlapping functions. The result was a remarkable example of apparent administrative chaos, but on the whole the scheme worked very well, although it involved overlapping, friction, unnecessary correspondence, and administrative waste. The whole problem, in his opinion, depended for its solution on finding the ideal unit of administration. Public health work had developed so much, and conditions varied so widely, especially as between urban and rural areas, that he was of opinion that each county should be left to formulate its own scheme, without any one scheme being regarded as a precedent for different areas.

Dr. W. F. Dearden (factory surgeon and port sanitary officer, Manchester) said that if a factory prejudiced the health or comfort of a community by polluting the atmosphere, or rivers, or sewers in the neighbourhood, the community should have the right to interfere. But the processes in the factory itself were not the concern of the community as such. Such conditions must be regulated by the industry itself and not by the local authority. Already any industry which endangered the workers was governed by regulations which were drafted after consultation between representatives of the employers, the workers, and the Home Office. The administration of such regulations could not be undertaken by local authorities, certainly not with any hope of uniformity of action.

Dr. J. Middleton Martin (county medical officer, Gloucestershire) gave as an illustration of the confusion that had arisen in public health administration cases in which a local authority had certain duties to perform in connexion with elementary schools and maternity and child welfare work, while the secondary schools and other branches of maternity work, including the supervision of midwives, were under the county council. The hopes of those interested in the co-ordination of these services had been raised by the proposals of the Minister of Health with regard to the rearrangement of the Poor Law medical services, but those hopes had been dashed by his acceptance of the present watered-down proposals. He was convinced of the fundamental necessity of there being one authority with one administrative head for all the health services of a community.

Dr. J. P. Kinloch (M.O.H., Aberdeen) explained the arrangements under which the City Council of Aberdeen had been enabled to take over the whole of the Poor Law hospital service, thus bringing about a real unification of public health services. He did not agree that there was any good ground for the divorce of factory hygiene and factory medical inspection from other departments of medicine and hygiene, and he believed that in time the duties of the factory inspector and the sanitary inspector might

well be combined. Discussing the size of the unit of health administration, he said this might easily be made too large. Perfect co-operation could be arranged between a central city with highly equipped hospitals and medical experts and the surrounding county units—a form of co-operation which it should be the duty of the Government to encourage.

Dr. H. S. BEADLES (Romford), representing the Poor Law Commission Committee of the Association, stated that unification, and not merely co-ordination, of all health services was already the settled policy of the Association, but such unification must begin at the centre, the Government departments concerned, and local health committees must not be the committees as now known. They must be strengthened by the co-option of representatives of the medical profession nominated by the local practitioners on the lines of the present Insurance Committees, with an Advisory Medical Committee.

Dr. H. SCURFIELD (late M.O.H., Sheffield) favoured experiments in the direction of unification by means of co-operation, as had already been done in Aberdeen, Gloucestershire, Essex, and Cardiff, so as to achieve a single public medical and nursing service with the consequent saving of time and money. He agreed with Professor Collis that the factory health service was a special one, and advocated closer co-operation between this service and the local public health department.

Dr. D. MCKAIL (Glasgow) expressed the view that all the confusion that had arisen was the result of ignoring the general practitioner. He thought that no one should be admitted into the ranks of the public health service without at least three years' experience of the "rough and tumble" of general practice.

Dr. E. H. SNELL (M.O.H., Coventry) said it took the allied armies during the great war some three years to discover that success could only be achieved under a unified command. When the public health service learned the same lesson it would achieve the same result.

Dr. W. A. LETHEM (Ministry of Health) emphasized the necessity of a general training in public health work of junior members of the service. The need for this would be increased by any further unification of such services. Difficulty had already been experienced in certain towns on the retirement of the chief official, when it had been found that the subordinates, who were familiar only with the work of one subdepartment, were not qualified to take his place. As the scope of preventive medicine widened it would become increasingly difficult to find men capable of looking upon public health work as a whole, unless an effort was made to train the junior members of the personnel.

Dr. A. S. M. MACGREGOR, in a brief reply, said he thought there was no doubt that the balance of opinion had been in favour of unification. He was himself convinced that some form of amalgamation of existing services was necessary and inevitable, but he could not agree that the factories should be included in any such scheme. In Glasgow a number of factories had already made their own provision for health services, and he was satisfied that this was the right line of development. He believed that the only alternative to a State medical service was "general practice" on a higher plane than had been known in the past.

GROWTH IN ITS PATHOLOGICAL RELATIONS.*

BY

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THE cells of the body having attained during foetal life their destined characteristics of form and function, according to those of the organs of which they form component parts, lose to a varying degree their powers of reproduction. Some tissue cells have lost that power before birth, some retain it as long as life lasts; but, in general, the earlier the time at which complete differentiation of form and specialization of function have occurred, the less these powers can afterwards be displayed. At no time can we say that any normal cell, however undifferentiated, has an unlimited potentiality of proliferation; its bounds and its destiny are set before it by natural factors, of which we have only the vaguest and most imperfect notions. From its behaviour in normal circumstances we are not entitled to assume that it had more than rigidly restricted powers of reproduction, but by our observations of the phenomena of repair we can be certain that some cells at least have a hidden reserve of power, and by cultivating normal tissue cells in suitable nutritive media outside of the body we can demonstrate that they are actually endowed with limitless reproductive powers, which, in whatever way they are controlled, are not exhibited in the living composite organism. Not every kind of tissue cell has been cultivated so far, but since we have succeeded in growing such early and severely specialized cells as those of cardiac muscle, and have seen these cells exhibit their characteristic physiological property of rhythmical contraction, we may safely assume that all kinds of tissue cells have this potentiality. This autonomy is not lawless: each kind gives birth only to cells of the same class and characters; they remain in close communion with each other; they tend to arrange themselves in the pattern that prevailed in the organ from which their ancestors were removed; but when such a colony, accustomed for many generations to its independence, is returned to the animal body the unrestricted power vanishes at once. It has been claimed that by employing certain agents, which we have used to induce malignant change in body cells, the cultivated cells can so be affected that their reproductive powers will not be restrained even in the environment of the living body, but the claim has not been corroborated. However that be, it is now beyond doubt that tissue cells have inherent powers of limitless growth, and that these powers are kept in check by some inhibitory factor in the body.

Throughout life, in normal physiological conditions, we have tissue cells that are constantly being lost and replaced, and others that in post-foetal existence remain constant, fixed in number, and irreplaceable. The squamous epithelium of the surface and of cavities in communication with it, and the glandular epithelium of the intestinal tube, as well as of certain gland structures, are examples of the former, whilst ganglionic nerve cells serve as a good example of the other extreme. It is true that cells of the former class are quite highly differentiated in form and in function, but bearing in mind that in certain conditions in adult life a glandular epithelial cell may assume the characters of a squamous epithelial cell, though the converse is more doubtful, we may say that the specialization is not absolutely rigid. In physiological replacement the activity is confined to the one tissue, and adjacent tissue cells do not participate, nor is the replacement out of uniformity with the original plan. Whether the connective tissues are normally in this state of continual renovation, or fixed and unchanging, is a question that, in the nature of things, cannot be determined.

In reparative processes following loss by wounds or degenerative lesions the active proliferation of connective tissue cells is such a predominant feature that the regenerative powers of other tissue cells are for the most part masked and overwhelmed; but still it may be said that the latter exhibit the property in inverse relation to the degree of their specialization. At one extreme the epithelial tissues display considerable powers of proliferative regeneration, and at the other the reproduction of such rigidly specialized cells as cardiac muscle and nerve cells is wholly suppressed. There are signs that ordinary striped muscle cells make a feeble attempt at repair, but it can hardly be claimed that they actually multiply. When the injurious

* The opening paper of a discussion in the Section of Pathology and Bacteriology at the Annual Meeting of the British Medical Association at Edinburgh, 1927.

action is repeatedly inflicted—that is, when it becomes a question of irritation—the stimulus induces an exaggerated repair, and the multiplication of cells is excessive. This hyperplasia in the ordinary course of events is temporary, as, owing to the subsequent maturation of the connective tissue cells, with the consequent devascularization, a shrinkage to or below the original limit occurs. That the proliferation of cells should cease when the defect is made good is no less mysterious to us than that they should commence to multiply to fill the gap. In the same process are exhibited the inherent capacity of cells to multiply and the restraint exerted upon them when the original plan has been restored. Sometimes the inhibition is late in coming into operation, as in the case of keloid formation, but the phenomenon of arrest is always evident. As we pass to tumour formations the less do we see exerted this repression of an inherent power in the cells, until in the extreme degree of malignancy the restraint on cell proliferation is almost entirely removed.

The boundaries between reparative growth, hyperplasia, and neoplasia are impossible to define—in fact, a tumour is a localized hyperplasia; nor is there any strict separation possible between benign and malignant growths as a whole. The words "benign" and "malignant" are clinical terms, and though they can often be related to histological appearances in tumours, yet the relationship is by no means invariably close. The gradation of the various processes suggests a difference of degree rather than any qualitative distinction; in short, the cell in neoplasia acquires no altogether new capacity compared with the cell in reparative regeneration. It will follow from this that tumours can only arise from such cells as can regenerate, and the frequency with which cells take part in neoplastic processes will be inversely related to their degree of specialization. But at once we are confronted with the fact that tumours are found composed of cells which do not multiply in adult life. The work of Cohnheim, by laying particular stress on these exceptional tumours, and by referring all tumours to the same origin as he quite rightly attributed to them, has given them an undue prominence. If cardiac and voluntary muscle cells, ganglionic nerve cells, and cartilage cells do not regenerate in post-foetal life, we must either give up our contention or fall back on the explanation that tumours composed of these cells have arisen from them when they were still in an embryonic and less highly differentiated state. In the latter case we may imagine with Cohnheim that such cells were cut off from communion with their kind which went to form useful organs, that they lay dormant with their proper destiny thwarted and their innate powers of reproduction still preserved until such time as some unknown stimulus unloosed them.

Let us examine these disturbing tumours more closely. Cardiac muscle tumours are the rarest of all tumours; they are composed of peculiar cells which here and there display the characteristic striation in parts; they are small in size; they are accidental *post-mortem* findings; they have no malignant characters; and they are doubtless congenital. A peculiar feature of striped muscle tumours which are also pathological curiosities is that they are found mostly in situations where voluntary muscle does not normally exist, and then generally in association with other aberrant tissues, and it has been held that they originate from smooth muscle and not from striated muscle. At any rate, we have no satisfactory evidence of the formation of such tumours from adult striated muscle, and it is generally agreed that they originate from embryonic remains. Rare, too, are tumours composed of nerve cells. Such tumours seldom show malignant characters, and they make their appearance evident at an early age. They are undoubtedly congenital. The retinal neuroma, on the other hand, which betrays its presence in early infancy, is highly malignant. Sometimes it is bilateral and sometimes familial. It is derived from one of the most highly specialized classes of cells in the body, but everything points to its origin before birth. These examples will serve to show that we must suppose a retention of embryonic proliferative properties to explain certain exceptional tumours, but it is as easy to believe that they started as tumours when the parent cells were not rigidly specialized as that they arose in later life from segregated cells that had lain dormant and docile for years. No one will deny that there are segregations of cells cut off in development and that they are by no means infrequent, but that these isolated communities are more prone than normal adult tissues to neoplasia is open to doubt. Still, experiments on the production of cancer have proved to us that it is possible so to change the nature of epithelial cells that while they may remain for a long time unaltered in microscopical appearance or in behaviour, they will subsequently flare up in malignant proliferation. There is thus experimental evidence that may be adduced in support of Cohnheim's contention. The tendency to explain morbid growths as originating from embryological faults is less pronounced now than formerly. For example, cartilage is a tissue which seldom if ever regenerates, and yet chondromata are not uncommon, and while we must admit a developmental fault in the case of the ecchondroses, yet for the true chondromata and for the mixed cartilaginous tumours another explanation is feasible. It is probable that the connective tissue cell may form collagen or elastic fibres, or a myxomatous, cartilaginous, or osseous matrix in different circumstances. In pure chondromata the very frequent association of myxomatous and cartilaginous areas is very suggestive, and still more is this the case in the mixed tumours. When we reflect that osseous tissue may be found in arteries and can be produced in them experimentally by painting the vessel with such substances as silver nitrate, and, above all, when a sarcoma can be produced by tar injections in rats which will show areas of cartilage and bone, we have no option but to believe that the connective tissue cell is not unalterably fixed in adult life and may exhibit rather surprising metaplasia.

The reproductive power of cells, as has been said, is in inverse ratio to their degree of specialization; but this is not invariably the case. The cells of the mammary gland multiply in preparation for their most highly specialized function—lactation; and probably also in response to the stimulus of the ovarian hormone. Malignant neoplasia rarely occurs in the male gland, which is not highly differentiated in function. It is remarkable that when mice are inbred for the development of strains with a high incidence of mammary carcinoma, the spontaneous tumours occur only in the females, and if the females are spayed during the first few months mammary tumours do not appear in them. Thus a less functionally specialized epithelium is less prone to neoplasia than one more highly developed—an exception to the general rule. What the ordinary function of the mammary gland may be is unknown: the secretion of milk is certainly a very evident function, but, after all, it is only occasionally that it is called forth. Malignant tumours of the breast are almost as common in barren women as they are in those who have suckled children.

On the other hand, the degree of malignancy in a tumour corresponds with the degree to which the constituent cells lose their functional properties. In the intestinal tract, for example, the secretion of mucin is one, though perhaps not the chief, of the functional activities of the epithelial cells; but in carcinomata arising from these cells it can be shown, by appropriate staining, that this function is very greatly diminished and in extreme cases may be entirely suppressed. The instances might be multiplied, but here again there are apparent exceptions to the rule. In melanotic cancers the intense production of melanin is characteristic, and though in parts of such tumours, indeed sometimes in whole metastatic nodules, the melanin may be largely awanting, and though the impression of abundance may be due mainly to the mass of tissue, yet individual cells would seem to be as densely crowded with the black granules as any normal chromatophore. Despite the great amount of investigation that has been done in the chemistry of malignant cells, there is little or nothing to suggest any qualitative distinction from normal cells, the differences being for the most part quantitative and inconstant. While recognizing exceptions, we may say that the exercise of the reproductive power of the cells is maintained at the expense of their other properties.

The analysis of this inherent reproductive power of tissue cells displayed physiologically, in repair, and in neoplasia,

presents problems of the first magnitude to all biological sciences, and is not the province of any one alone. It would seem as if the same principle were in action in the three phenomena, the resulting reaction being determined by the extent to which some inhibiting process was at work, and in the almost complete absence of definite knowledge of this growth principle the pathologist is thrown back on the study of the inhibitions, how they are removed or how they may be fortified. The older conception, of which Ribbert was an exponent, was that the inhibiting factors were purely environmental: if the restraint of the environment were weakened or removed the cells of a tissue would exhibit their innate property of unceasing multiplication. It has already been mentioned that by cultivating cells in suitable media outside the body this can be demonstrated, and that if these emancipated cells be returned to the animal body the process is arrested, and we might be tempted to conclude that the arresting force was exerted purely by the environment. But if the cells cultivated have been from a malignant tumour originally, the implant will go on increasing, and yet the environment in both cases is identical. From the impasse into which this has led us there are two ways of escape—either to assume that malignant cells have acquired an entirely new property not possessed in any degree by normal, reparatory, or benign tumour cells, or that they have developed in excessive abundance an already existing property. In the former case an easy explanation would be that in the cancer cells there is an extraneous agent, remaining always intracellular, which stimulates these cells to division and multiplies with them. This conception forms the basis of the parasitic theory, which has been rejuvenated by the strikingly original investigations of Gye and Barnard, and still more by their daring, and perhaps somewhat risky, conclusions. If we accept the other idea we shall have to conceive of a growth substance generated by the cells, capable of being stimulated to overproduction. In wound repair we may imagine that there is a transudation of growth substance in limited amount which not only stimulates the particular parenchymatous cells to reproduction but also stimulates the adjacent connective tissue. In neoplasia the stroma formation is even more essential. It is difficult to conceive any other means of local stimulus to connective tissue formation than the outpouring of some factor from the neoplastic cells. So far no one has been able to isolate this hypothetical growth substance, and the evidence for its existence is indirect and of doubtful validity. As is well known, animals may be "immunized" against transplanted cancer by previous treatment with red blood corpuscles, splenic tissue, and other unkilled tissues of the same species, and the only difference that can be detected in the phenomena that follow the inoculation of grafts in the refractory and the control animal is that in the former no stroma formation is evoked. Although it is impossible to find in the refractory animals any of the known serum antibodies, we may imagine that the immunizing treatment has induced the formation of an antagonistic substance which neutralizes the growth substance poured out by the cancerous cells. There is another experimental observation which supports the notion of the outpouring of growth substance. In the transplantation of certain strains of mammary carcinoma in mice and rats sarcomatous transformation of the stroma tends to occur. In ordinary cases the stroma introduced along with the parenchyma in grafts always dies and is replaced by new stroma furnished by the new host, but in these cases the stroma continues to proliferate. That the implication of epithelium of the same kind adjacent to a carcinoma is due to the same thing is much more dubious. But when all is said, we must confess that we have no explanation of the unfailing transmission of the acquired property from cell to daughter cell. That growth may be temporarily arrested in malignant neoplasia, even for long years, is certain, but the cells so arrested do not lose their power. Heiman of the Crocker Research Laboratory has implanted a very active carcinoma into the midst of a slow-growing transplantable fibroma of the rat, and in this fibrous prison the carcinoma lives but does not increase, but if it is set free from its bonds, by the cutting up of the composite tumour or by transplantation into a new host, it demonstrates its malignancy. Here the proliferation is quite arrested, it may be for long periods, but the malignant potentialities of the cells are not destroyed. Must we, then, conclude that there is a fundamental difference between the normal and the cancerous cell, and that the latter possesses some property quite foreign to the other, something extraneous? It is tempting to seek rest for our puzzled minds in such a belief; but when we face the fact that we can induce cells to become malignant by the use of certain carcinogenic agents long administered, and more especially the fact that we can biologically affect cells so that after a long period of normal quiescence they will break forth into malignant proliferation, we must reconcile ourselves to the troubled doubts that may lead us to clearer knowledge.

Discussion.

Professor R. Muir (Glasgow) said that the cellular proliferation underlying pathological growth constituted a fundamental question. No real explanation of it could be given; at present little more could be done than to analyse and classify the factors concerned in its occurrence. Apart from tumour growth, cellular proliferation was recognized to result (1) from breach of continuity, (2) from irritation, and (3) in the case of certain tissues, from excessive functional demands; cellular hypertrophy being followed by hyperplasia. Each of these must be further analysed. But there were other examples of proliferation which could not be placed under these headings, as, for example, the regenerative proliferation of erythroblasts after haemorrhage and the proliferation of myelocytes in leucocytosis. The question as to what extent definite substances acted as stimuli to proliferation was very important. The excessive growth of certain tissues in hypophyseal superactivity was a well recognized example of such an occurrence, but in connexion with tissue culture it had become a practice to speak of growth-promoting substances, stimuli, or trephones, and to explain the proliferation as the result of their action. It was very important to distinguish essential foodstuffs from true stimuli to growth. In the case of repair of wounds it had hitherto been customary to ascribe growth to the removal of the restraining effect of the adjacent cells. The proliferation occurred when the tissue balance was disturbed, and continued until it was restored. The question was whether the phenomena could be explained on the hypothesis of definite stimuli supplied by leucocytes or other cells. Tissue cultures were unsuitable for determining the matter, as in them the normal cell relationships were wanting, and the fact that embryonic juice promoted proliferation was not enough to show that it was effective by itself. An example was still needed to show that such stimuli could cause proliferation when the relationship of cells was *not* disturbed. It must be borne in mind also that repair in mammals was the representative of the more complicated process of regeneration in lower vertebrates, which latter in its turn was a reproduction of the phenomena of ontogeny. At present it did not appear justifiable or possible to explain the proliferative processes in repair as being the result of growth-promoting substances alone.

With regard to neoplastic proliferation, it was important to recognize, as regards conditions of occurrence, two types of tumour—namely, that which might result from irritation of previously normal tissues, and that which followed some disturbance of development. The question as to what extent tumours arose from displaced cells or "rests" was a separate matter, but the all-important fact was that there were various kinds of tumour—such as neuroblastomas and blastocytomas—which must arise from cells which had not reached the adult state and which were sometimes multipotent. The recent work on tumours of the central nervous system illustrated this in a striking way, as it appeared that a growth might originate at any stage in the differentiation of the original medulloblasts. Again, a simple hepatoma resulting from congenital abnormality might become malignant and give rise to metastases; in cirrhosis of the liver the compensatory hyperplasia of the liver cells might pass on to neoplastic proliferation, and,

again, malignant properties might appear. What might be called the life history in the two instances was widely different, while the end-result was the same. Any explanation of tumour growth brought forward must apply to the two types.

Professor J. Shaw Dunn (Manchester) thought that in spite of greatly varying cellular structure there was much in common in the general biological aspect and behaviour of simple tumours, while the malignant forms, though derived on the one hand from connective tissue cells, on the other from epithelial, and differing in intimate architecture on that account, showed more features of similarity than of difference, and were clearly separable from other active proliferative processes of known causation. The whole group of tumours retained a certain uniformity of general idea, which was borne out by the not uncommon occurrence of linking forms and of simple growths which ultimately became malignant. It appeared reasonable to suppose that, if new growths had not a common cause, yet there must be in the genesis some general etiological principle which would link together this group of morbid activities, somewhat as the conception of organismal infection linked together the diverse group of bacterial diseases; but a review of the etiological factors known to be concerned in neoplasia showed little or no suggestion of any such unifying consideration. Recent experimental work with certain chemical substances had shown that tumour growth, often with malignant characters, could be induced after sufficiently prolonged application, and this not only provided a direct explanation of a limited number of human growths, the industrial cancers, but suggested a similar explanation of some tumours of the alimentary tract where the irritating agents were not definitely isolated. Pre-existing damage was another factor that in some way led to cancer formation. Cancer of the liver was very rare apart from hepatic cirrhosis, and it developed on the latter in at least 3 per cent. of cases. Cancer of the kidney was associated with pre-existing renal lesions. All were familiar with the development of epithelioma on scars. Again, the development of malignant tumours from simple tumours was not uncommon, and it was hardly possible to escape the conclusion that the more serious condition was predetermined in the earlier cellular activity however that, in its turn, might have been caused. The influence of true hereditary factors in the production of tumours was evident from the occurrence of such malignant forms as retinoblastoma, more simple tumours as angioma and neurofibroma, and simple tumours liable to become malignant, such as polyposis coli. In xeroderma pigmentosum the coincidence of two factors would appear to be necessary—an hereditary susceptibility, and the irritant action of the physical agency, sunlight. Whatever were the factors so diversely concerned the end-result was the same in all cases, and it was hardly legitimate to ignore the implications if an attempt was being made to discover any general etiological principle. The question as to whether this principle might be of the nature of a special type of organism had not been raised there, as there was no evidence available in relation to human or even mammalian growths which pointed definitely in that direction. The production of some tumours by external chemical agencies, and the predominant part played by true hereditary factors in the genesis of others, were facts which did not encourage belief in a specific organismal cause. The available data rather suggested that enlightenment must await a more complete knowledge of the conditions regulating cellular proliferation and the harmonious relationship between different kinds of cells in the tissues.

Professor E. H. Kettle (Cardiff) believed that it was generally assumed that malignant and innocent tumours and simple hypertrophies were merely exaggerations of the normal physiological process of growth, but he thought that it might be doubted if these phenomena were really comparable, or even that all forms of malignant growths were examples of the same process. Was it justifiable to regard growth or enlargement as necessarily the same thing as cell multiplication? What was the difference, if any, between local and general growth? Even if these forms of protoplasmic activity were fundamentally similar, it must be admitted that they might be due to several different causes. The power to grow might be latent, but it was inherent in all living matter, and might manifest itself at any time in response to an appropriate stimulus. It would scarcely seem necessary to seek for any further explanation of the ordered enlargement or growth of the developing individual than this inherent property of the cells, but even this form of growth was subject to controls. It might, for example, be inhibited or increased by the presence or absence of various hormones. The phenomenon, therefore, was not simply an example of the inevitable performance of an inherited function, whether spontaneous or in response to stimulation; in adult life this became even more apparent. A substance which stimulated cells to multiply was produced in the degeneration of cell protoplasm, and presumably the cellular proliferation by which the healing of wounds was brought about was due to its presence. Its action could be demonstrated *in vitro* by the technique of tissue culture, and its presence had also been shown in the intact malignant cell. The suggestion was that the malignant cell differed from the normal in that there existed within it the growth-promoting substance which normally was found only when cell protoplasm broke down. If this view was correct it was obvious that malignancy was not merely an exaggeration of the normal physiological process of growth, for the malignant cell had definitely acquired a new property. It was scarcely likely that the matter was so simple as this. The development of a malignant new growth appeared to be accompanied by a constitutional change, according to Murray's experiments, so that the other tissues of the body no longer reacted in the normal way to cancrogenic agents. Even in the simple healing of wounds the presence of some other controlling force besides the growth-stimulating substance seemed probable, for how otherwise could be explained the nice adjustment of the covering epithelium in the healing of superficial wounds?

Though it was necessary to guard against too wide an application of the results of tissue culture, some observations by the late Dr. Strangeways seemed highly significant; he had pointed out that the cell was at its most plastic and impressionable state during division, and had suggested that cell division was the process by which the cell could best reorganize its protoplasm so as to adapt itself to altered physiological conditions. If the cell was in a state of physiological equilibrium it remained quiescent or vegetative, but should this equilibrium be upset, usually by alterations in environment, it adapted itself by such a mingling and reorganization of its protoplasmic molecules as could only occur in the process of division. From this point of view, therefore, the growth or enlargement of a tissue might be the accidental result of a cellular proliferation which itself was purely protective.

Professor M. J. Stewart (Leeds) stated that a careful scrutiny of necropsies during many years for the presence of adrenal rests and epithelial heterotopias of the stomach had shown that such occurrences were by no means uncommon; that they were unduly predisposed to tumour formation, in comparison with other tissues, could not be conceded. It was a different matter, however, to maintain that Cohnheim's theory thereby failed. It had to be admitted that no direct proof of Cohnheim's hypothesis had as yet been forthcoming; in the nature of things it seemed doubtful if this would ever be attainable. Yet this hypothesis remained an attractive one, especially to explain the origin of teratomas in situations other than the sex glands. It was not suggested that the hypothesis alone was sufficient, but it might well cover a part of the truth; in addition some factor or factors must be predicated to account for the onset of proliferation. Most of all was some additional explanation necessary in respect of malignancy—such, for example, as Adami's "habit of growth theory." It had been maintained that the functioning cells of fully differentiated tissues were no longer capable of proliferation, and that all loss of tissue, whether by accident or from wear and tear, was made good by the multiplication of physiologically hypoplastic cells, these constituting the germinal and regenerative centres of the

tissues. That was merely a generalization from what must obviously occur in the maintenance, for example, of surface squamous epithelium, where proliferation was confined to the undifferentiated germinal layer. It did not seem a great step from such a conception to Cohnheim's theory of cell-rests in relation to cancer. That cancer cells were able to remain in the tissues for considerable periods without appreciable proliferation was clearly shown by the experiments quoted by the opener of the discussion and by the numerous instances on record of metastases remaining dormant and inactive over many years.

Professor J. Lorrain Smith (Edinburgh) said that while recent investigation of tumour growth had dealt chiefly with etiology, the progress made had revived the question of the nature of the process. The discussion of this aspect of the subject had long been familiar in the contrast drawn between tumour, hypertrophy, repair, and regeneration. More recently cytologists had taken up the study of cell differentiation, especially in relation to changes in cytoplasm. The application of biological methods to corresponding changes in tumour cells was a problem for future investigation. A certain approach to it had been made in Unna's study of skin cancer. Adopting as a basis of classification the architecture of the normal skin, he opened up a field of investigation. In the lower layers of the rete mucosum the cells maintained active division and afforded an example of continued growth. On division of the cells in these basal layers the growth of the skin depended. Two types of cell were produced—one which remained a basal cell with power of continuous division, and another which passed from the basal layer to become a prickle cell, finally receiving the form and composition of a surface squamous cell. With this differentiation the power of division was gradually lost. There was, therefore, a double product from the original division. The architecture of the skin resulted from the production and maintenance of the two types of cell. In the one type there was continued division originating new basal cells, and in the other there was differentiation in the direction of keratin scale formation, and the power of division was lost. The haemogenetic tissue afforded another clear example of biological architecture. The primitive blood cell in division, continuously maintained, produced cells which remained primitive blood cells, and, at the same time, cells to become gradually transformed into red corpuscles; these, like the squamous cells, had lost their power of division. In cancers of the skin, as Unna had shown, the normal architecture was disturbed in a considerable variety of ways. With this principle of interpretation as a guide he reached a classification of cancer of the skin according to the type of disturbance. Whatever might have been the result of recent work on etiology, it must be acknowledged that it had provided a new means of investigating experimentally the process of cancer growth in relation to the process which in the normal tissue resulted in its biological architecture.

LACRYMAL OBSTRUCTION: ITS NASAL ORIGIN AND INTRANASAL TREATMENT.*

BY

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The exact pathology of lacrymal obstruction is still somewhat obscure. The part played by diseases or abnormalities of the nasal passages and accessory sinuses is considered to be more important than descending infections from the conjunctival sac. According to Kühnt, nasal diseases are responsible for 93.7 per cent. of cases of lacrymal obstruction, while a leading textbook on ophthalmology quotes as causes: inflammatory conditions of the nasal mucous membrane; simple catarrhal tuberculosis, and syphilis; ulcers of the nose, tuberculous, syphilitic, and lupoid; and nasal tumours, especially polypi blocking the lower orifice of the nasal duct. Brückner, although he regards nasal causes as uncommon, admits that in the majority of cases diseases of the lacrymal apparatus are nasal in origin.

The purport of this paper is to report the results of an investigation into the nasal condition of 120 cases of lacrymal obstruction observed by me during the last four years through the kindness of my colleagues at the Manchester Eye Hospital.

Incidence.

The susceptibility of the female sex to lacrymal obstruction is a well known fact, and has, I believe, never been satisfactorily explained. In the present series 102 cases occurred in females and 18 in males.

The following table giving the age incidence of the disease shows that the greatest number of cases occurred between the ages of 30 and 60, but that of the three decades in this period the numbers of cases were practically equal.

1—10 years	4 cases
10—20 ,, ...	5 ,,
20—30 ,, ...	12 ,,
30—40 ,, ...	26 ,,
40—50 ,, ...	34 ,,
50—60 ,, ...	25 ,,
60—70 ,, ...	9 ,,
over 70 ,, ...	3 ,,

The oldest was 74 and the youngest 6 years. The shortest duration of symptoms, such as epiphora, was six months; the majority, however, had presented symptoms for two years or more.

Etiology.

Injury.—Any injury in the region of the inner canthus producing either a fracture of the infra-orbital margin or of the frontal process of the superior maxilla may mechanically obstruct lacrymal drainage. Similarly a chronic traumatic periostitis in the region of the lacrymal fossa following injury without fracture might be an etiological factor. A definite history of injury was obtained in only 5 cases (4.1 per cent.): 2 developed an abscess over the sac immediately following the injury, with subsequent epiphora, whilst 3 presented a definite scar, and in all the epiphora began immediately upon receipt of the injury.

Breadth and Width of Nose and Nasal Passages.—Whitnall has shown that the breadth of the lacrymal fossa varies with the shape of the skull, being wider in the brachycephalic and narrower in the dolichocephalic types. The lacrymal fossa is deepest at its base where it joins the naso-lacrymal canal, but Gérard has found that the canal is narrowest at the orbital opening, its lower end under the inferior turbinate body being wide and almost funnel-shaped. Moreover, the direction and inclination of the lacrymal passage is dependent upon the configuration of the facial skeleton, being influenced by the breadth of the bridge of the nose and of the nasal aperture, as also by the development of the maxillary sinuses. Testut showed that, seen in profile, the lacrymal fossa and canal slope gently backwards, forming an angle of 15 to 20 degrees with the frontal plane, while, viewed from in front, the fossa slopes outwards towards its lower end and the canal slopes inwards towards its nasal opening, together forming a curve the concavity of which is directed inwards, the summit being near the upper orifice of the canal—that is, the orbital opening. This lateral obliquity of the medial wall of the fossa is more marked in narrower noses. A narrow lacrymal fossa or an acutely curved lacrymal passage may more readily predispose to obstructive symptoms. The breadth of the nose and the width of the nasal passages were found to be distinctly narrow in only 13 cases (10.8 per cent.), and in only one of these was the epiphora bilateral. The intranasal prominence of the lacrymal groove was a distinct feature in all these cases. In 16 cases (13.3 per cent.) the nose and nasal passages were noted to be unusually wide, and the epiphora was bilateral in 6 cases. In none of the series was the size of the nasal passages dependent upon any deviation of the nasal septum.

Nasal Pressure Deformities and Reflex Neuroses.

Onodi considers that "the ostium of the nasal duct may be wholly or partially occluded by hypertrophy of the turbinates, by polypoid and papillary degeneration of the anterior end of the inferior turbinate, by foreign bodies, dental cysts, syphilitic and tuberculous lesions, etc." And

*A paper read in the Section of Ophthalmology at the Annual Meeting of the British Medical Association, Edinburgh, July, 1927.

again, "Changes which take up space or exercise pressure, such as tumours, polypi, the so-called bone cysts, cystic swelling of the middle turbinate, mucous or purulent, spurs and deviations of the nasal septum, will have a like effect." Apart from actual obstruction in the lacrymal passages, Onodi further considers that "there may be a reflex neurosis set up which can evoke from the nose a reflex epiphora." Fischer, quoted by Onodi, describes the cure of a large lacrymal sac the size of a hen's egg following the resection of the anterior end of the inferior turbinate body.

It is difficult to realize how pressure from an enlarged turbinate bone, deviated septum, etc., can mechanically obstruct a membranous lacrymo-nasal tube, lodged as it is in a bony canal. Alterations in the width of the nasal passages following such lesions, which would kink the lacrymal canal, are a rarity. Stimulation of the nasal branches of the trigeminal nerve from nasal pressure deformities may reflexly excite excessive lacrymal secretion with resultant epiphora, but, without some obvious intranasal lesion which would mechanically obstruct the lacrymal passage, permanent distension of the lacrymal sac does not seem to me to be possible.

Enlarged and Displaced Middle Turbinates.—The middle turbinate was noted to be moderately enlarged in 12 cases (10 per cent.), occupying the space between the nasal septum and the outer nasal wall, but with no deflection of the nasal septum. In no instance was there massive cystic enlargement of the turbinate. Six of the series presented a distinctly oedematous appearance of the anterior end of the turbinate body. In two cases (not included in the above) the turbinal enlargement was on the side with no epiphora. The anatomical relation of the middle turbinate body to the lacrymal fossa is of interest, since Thorsch found that in a series of 79 specimens the middle turbinate in 52 instances lay completely behind the lacrymal groove. In four instances (3.3 per cent.) the middle turbinate was displaced outwards without any enlargement and not due to a deviated nasal septum. The peculiarity of these displaced turbinates is that the anterior tip of the lower border was distinctly curved outwards and pressing against the outer wall.

Deviated Nasal Septa.—In only 10 cases (8.3 per cent.) was the deflection of the nasal septum severe enough to displace the middle turbinate against the outer wall. The epiphora was in nine instances on the side of the septal deflection, while the tenth presented a bilateral epiphora which was worse on the side of the deflection. In 15 cases the septal deviation was too slight to have any bearing on the etiology, while in 7 cases the septum was deflected towards the side with no epiphora.

Inferior Turbinate Bone.—Considering the anatomical relationship of the inferior turbinate body to the nasal opening of the lacrymal duct it might be thought that lesions of the inferior turbinate would be frequently seen in cases of epiphora. There were, however, only two instances (1.6 per cent.) of moderate enlargement in the present series. It is, I believe, now generally accepted that the site of obstruction in the majority of cases is at the neck of the sac and not at the nasal orifice.

Rhinitis.—Atrophic rhinitis, usually a bilateral disease, was present in 7 patients (5.8 per cent.). The epiphora was bilateral in 4 and unilateral in 3 instances. Hypertrophic rhinitis occurred in 6 cases (5 per cent.), with bilateral epiphora in 3 patients, all boys, aged 9, 10, and 13 years, with marked hypertrophic rhinitis. Simple catarrhal rhinitis was only seen twice (1.6 per cent.).

Accessory Nasal Sinus Disease and Lacrymal Obstruction.

The lacrymal fossa in its upper half is related to the anterior ethmoidal cells, its lower half being related to the middle nasal meatus. According to Whitnall, in the majority of instances (54 per cent.) the anterior ethmoidal cells extend as far forwards as the anterior margin of the lacrymal groove and even into the frontal process of the superior maxilla. Less frequently the lacrymo-maxillary suture (32 per cent.) or the posterior margin of the lacrymal fossa (14 per cent.) forms the anterior boundary of the ethmoidal labyrinth. Pus arising from a suppurative ethmoiditis not infrequently spreads through the lacrymal bone into the lacrymal groove and points externally at the inner canthus. A subacute or chronic inflammatory condition of the anterior ethmoidal cells may similarly extend through the lacrymal bone, producing a local periostitis in the lacrymal groove. The neck of the lacrymal sac may thus be constricted. Moreover, the close anastomosis existing between the venous and lymphatic plexuses of the ethmoidal, as also the maxillary, air sinuses and the mucous lining of the lacrymal drainage apparatus would appear to render the latter susceptible to obstructive lesions in inflammatory states of these sinuses. Ethmoiditis occurred eight times (6.6 per cent.) in the present series. There were two cases of closed empyema, four cases of cystic degeneration, and two of non-suppurative ethmoiditis with single polypi. There was no case of extensive suppurative ethmoiditis with multiple nasal polypi, nor was lacrymal obstruction found associated with an empyema of the maxillary sinus.

History of Nasal Disease.—A history of previous nasal trouble was a rarity, either spontaneously stated by the patient or admitted after interrogation. The majority of patients could give no explanation for the onset of the lacrymal obstruction and denied any knowledge of previous nasal trouble.

Table showing Incidence of Nasal Diseases, etc.
No. of cases examined 120.

Nasal Lesion.	Percentage Incidence.
Injury	4.1
Breadth of nose and nasal passage—	
Narrow	10.8
Wide	13.3
Enlarged middle turbinate bones (moderate only)	10.0
Misplaced middle turbinates	3.3
Deviated nasal septum	8.3
Enlarged inferior turbinates	1.6
Rhinitis—	
Atrophic	5.8
Hypertrophic	5.0
Simple	1.6
Ethmoiditis—	
Closed empyema	1.6
Cystic	3.3
Non-suppurative with single polypi	1.6

Results of Intranasal Treatment.

To test further the etiological factor of such nasal abnormalities as were discovered, treatment for their relief was undertaken with the following results:

No relief of the epiphora or lacrymal sac distension followed non-operative treatment for the various types of rhinitis, except that in two cases of marked hypertrophic rhinitis some amelioration of the epiphora resulted from shrinkage of the inferior turbinate body induced by the electric cautery. In both of these cases the epiphora was very pronounced and the improvement would seem to follow the relief of the nasal pressure reflex.

The nasal septum was straightened, and where necessary the anterior end of the middle turbinate bone resected, in ten cases, but with no alteration in the epiphora.

No cure of the lacrymal obstruction followed ablation of a cystic ethmoidal labyrinth (four cases).

Complete recovery of the lacrymal obstruction followed drainage of pus in the two cases of closed ethmoidal empyema. The special interest of these two cases lies in the fact that there was no history of nasal purulent discharge, no free pus in the nose, and, in the first case encountered, the existence of pus was not suspected before operation. In each case the ethmoidal labyrinth had been converted into one large single pus sac.

Intranasal Drainage of the Lacrymal Sac (West's Operation).

This method of treatment, now so familiar, consists in the establishment of intranasal drainage of the lacrymal sac by removal of its inner nasal wall after thorough exposure through the nose.

Intranasal drainage was performed 45 times, with complete recovery in 32 (71.1 per cent.), moderate recovery in 5 (11.1 per cent.), and failure in 8 cases (17.7 per cent.). The term "moderate" is reserved for those cases with slight epiphora when out of doors, but in whom distension of the sac no longer exists; included also under this category are those who, when examined, present some

tears at the inner canthus though the patients are quite satisfied. No case is included in the above figures in which operation has been performed less than six months.

J. S. Fraser, who has had a large experience of this operation, gives 73.4 per cent. cures, and this, I think, is the experience of all those who have essayed the procedure on any large scale. The operation should not be attempted in the presence of acute dacryocystitis. External incision and drainage must first be established and the inflammatory condition allowed to settle down. A slit canaliculus does not preclude a perfect result.

Conclusion.

It would appear from the present investigation that the incidence of nasal abnormalities, deformities, and diseases, in cases of established lacrymal obstruction, is a rarity. The failure in relieving the lacrymal obstruction following the rectification of such nasal lesions as were found, with the exception of suppurative ethmoiditis, which is in itself rare, seems to preclude them as etiological factors in lacrymal obstruction. The absence of a history of nasal trouble in the majority of cases, as also the rarity of the incidence of nasal disease, would seem to render the nasal origin of lacrymal obstruction "non-proven." That there is a nasal cause would seem to be undoubted, but its exact pathology and incidence still needs further investigation.

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Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

INTRATRACHEAL INJECTION OF LIPIODOL: GENERALIZED IODIDE ERUPTION: DEATH.

Lipiodol consists of iodine dissolved in poppy oil, and gives a very dense shadow under *x* rays. It is considered a safe medium for injecting into the spinal canal, for intratracheal injection, and for injection into the uterine cavity and Fallopian tubes.[1] Its use has now become so widespread that any untoward effects have a general interest.

L. W., a commercial traveller, aged 40, had two attacks of pneumonia, the last in February, 1926. A nervous breakdown, with loss of memory, followed the removal of many teeth immediately after this last attack. In October, 1926, he was in a nursing home at Margate for chest trouble for three months. He was admitted to the London Hospital on March 6th, 1927, for a pustular and papular eruption, which had lasted since injections of antipneumococcal vaccines in 1926. The palms and soles had "peeled twice" since, and he had been taking an arsenical medicine regularly.

He was a grey-haired, worried-looking man, with a short, frequent cough and greenish morning expectoration. The pulse was 88 to 96 and regular; there was no fever; the urine was natural; the systolic blood pressure was 140 mm. of mercury; the chest was symmetrical and resonant to percussion, with a coarse "bronchitis rub" on the left side. Heart, abdomen, and central nervous system presented nothing abnormal. There were numerous scattered purulent follicles in the beard area, and small scattered pustules in the hair of the lower abdomen and pubic region. The skin of the whole body was dry and slightly rough. The nails were curved over a little at their tips.

On March 11th a physician reported: "Physical signs are suggestive of an old arrested fibrous lesion of slight extent at both apices, but more in the left than in the right. This seems to be borne out by radiological examination. Investigation by *x* rays after lipiodol injection would be useful."

The patient was seen by an aural specialist on March 14th on account of vertigo: no aural cause was seen; there was slight catarrhal otitis only. The septum and turbinals had been operated on in Germany.

On March 31st an injection of 20 c.cm. of lipiodol was given by the intratracheal route, and an *x*-ray plate of the lungs taken.

Laboratory investigations showed that the blood cholesterol was 100.4 mg. per cent. The Wassermann reaction was negative, and tubercle bacilli absent from the sputum (three investigations). Pus from an abscess of the abdominal wall yielded *Staphylococcus aureus*. Blood culture (May 7th) was negative. Cultures of vesicles on forearms (May 3rd) were all sterile.

The temperature had been very irregular, and had risen to 101° by April 9th. On April 19th great numbers of small boils were appearing over the trunk and limbs. The voice was very hoarse and the cough more frequent and severe. On May 6th both forearms were covered with vesicles. Three days later the general condition was definitely worse; he was very weak, clear mentally, complaining of no pain, unable to cough with any force. He showed umbilicated drying vesicles all over the trunk, face, and limbs. On the legs many small scabs had come away, leaving raw granulating areas. Several who saw the patient during the last three days were suspicious of variola. No contact cases of variola developed. The vesicular fluid did not give any colour with starch paper. No iodides were found in the urine.

The patient died from bronchitis and heart failure on the evening of May 10th. No *post-mortem* examination was permitted.

During his stay in hospital the patient had been treated by epilation doses of *x* rays, barbitone for sleeplessness, varied by chloretone and local dressings.

This patient began to go downhill very definitely after the intratracheal injection of lipiodol. The eruption was one of the recognized types of rash that may follow the absorption of iodides.

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[1] Vilvandre, G.: "Diagnostic use of Lipiodol," *London Hospital Gazette*, 1927, xxx, No. 4, p. 86.

PALPABLE GALL STONES IN AN UNDISTENDED GALL BLADDER.

The following case is of interest inasmuch as I have never before seen a case or heard one demonstrated where gall stones in an undistended gall bladder were palpable through the abdominal wall.

A man, aged 46, consulted me in May, 1927, for an attack of pain in the upper abdomen. It was not extreme nor definitely of a colicky type, but was described more as a soreness.

The patient gave a history of repeated attacks of similar pain at intervals during the previous five years. The first, in 1922, was accompanied by a rigor and by vomiting, but on subsequent occasions there had been no vomiting. The only physical sign present was tenderness on pressure in the epigastrium and in the right and left iliac fossae; nothing in the nature of a lump could be felt on his first visit.

On July 14th he again presented himself as he had another attack of pain. On examination a hard spherical lump, which seemed the size of a large marble, was felt some two inches below the tip of the ninth right costal cartilage; it could be pushed about freely within the radius of about two and a half inches, and pressure on it caused definite uneasiness.

In spite of the fact that the history was somewhat suggestive of cholelithiasis, or at any rate cholecystitis, I felt that the lump, by very reason of its ease of palpation, hardness, and mobility, could hardly be the gall bladder.

A barium meal having revealed no abnormality of the stomach or duodenum, laparotomy was advised to ascertain and deal with the cause of the repeated attacks of pain. The patient was admitted to Swansea General Hospital, where he was kept under observation for a week. On admission the presence of the lump was confirmed by Mr. C. L. Isaac and his house-surgeon, Mr. A. H. Holmes. Three days later it could not be found, but two days subsequently it was again felt in its original position and of its original size, hardness, and mobility.

Laparotomy was performed on July 25th by Mr. C. L. Isaac, who, on opening the abdomen, immediately found and demonstrated the gall bladder, undistended, not obviously inflamed, freely movable, and full of stones. Cholecystectomy was performed and the patient made a good convalescence.

Although of lean build, the patient was not wasted and his abdominal muscles were quite well developed.

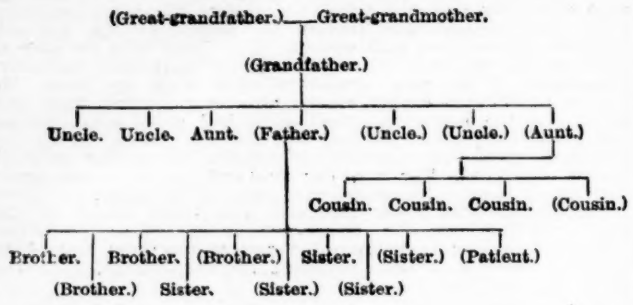
Swansea. F. H. Kingston Knight.

HEREDITARY DEFORMITY OF THE FINGERS.

The recently reported case of this condition prompts me to record one somewhat similar with which I came in contact a few weeks ago. In my case the feature on which I wish to lay stress is the fact that the deformity has been transmitted through both male and female members of the family; it also differs anatomically from that already published.

A girl, aged 6 years, said by the mother to be a 6½ months' child, exhibited the following deformity. Each finger consisted of only two phalanges, the proximal ones being of average length, but the distal shorter than the normal. The latter had rudimentary nails, which did not extend to the ends of the fingers. The thumbs had each only one phalanx bearing a shortened nail similar to the fingers. The child's feet showed no abnormality, though her sister, aged 10, had slight webbing of the toes. One of her brothers, aged 14, had no nails on the second and third digits; an adult brother with this deformity suffered little or no disability in earning his livelihood as a labourer.

The following table demonstrates the incidence of this abnormality in other relatives, those thus afflicted being in brackets.


(Great-grandfather.) Great-grandmother.
(Grandfather.)
Uncle. Uncle. Aunt. (Father.) (Uncle.) (Uncle.) (Aunt.)
Cousin. Cousin. Cousin. (Cousin.)
Brother. Brother. (Brother.) Sister. (Sister.) (Patient.)
(Brother.) Sister. (Sister.) (Sister.)

Inquiry from the mother as to the supposed cause of this deformity in the first instance elicits the following "old wives' tale," which she relates with apparent conviction. The great-great-grandmother, when she was young, lied about an apple which she had plucked from a tree, whereupon her parents threatened her with the curse that her children later on would be born with deformed hands.

Some painstaking investigations on a scientific basis into the initial etiological factors in these cases of hereditary deformities in general might, if successful, result in a very valuable addition to our knowledge of eugenics. It might, for instance, be possible even to discover some correlation between the strength or nature of the stimulus causing the initial variation from the normal and the number of generations it would take for all trace of the deformity to disappear completely from the series.

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DOUBLE TUBAL PREGNANCY WITH EARLY RUPTURE.

The seeming rarity of double tubal pregnancy leads me to believe that the following details of a case would be of general interest.

On August 31st a small, pallid, ill nourished married woman, aged 32, was admitted to the Birkenhead General Hospital, complaining of pain in the lower abdomen, accompanied by nausea, weakness, and a brownish vaginal discharge containing some blood, which had begun with the first onset of pain. She had enjoyed previous good health, with the exception of an attack of pneumonia in 1916. She had married in 1913, and her first child, born in 1915, is alive and well, as is her second child, which was born in 1918. In 1920 she became pregnant again, and in the sixth month a sharp haemorrhage followed three or four days after a fall. This ceased and the child was born in due course, but was puny and ailing, and died seven months later. Her health was good subsequently until the beginning of June this year, when she had a sudden transient attack of pain in the right lower abdominal quadrant; on the next day this returned, and there was a third attack three days later. Acute pain on the other side followed after some days, and during all this period she had a brownish blood-stained vaginal discharge. Up to the time of admission to hospital menstruation was said to have been regular, though it may be that there was misinterpretation of accidental haemorrhage. On the day following her admission pain and resistance were evident in both pelvic regions, with some abdominal distension, and a brownish blood-stained fluid passed from the external os. Bimanual examination disclosed a tender elastic swelling in both fornices, continuous with the uterus and extending to the pouch of Douglas; ruptured tubal pregnancy was suspected, and a laparotomy was ordered.

On September 2nd the abdomen was opened by central incision and the pelvis was found to be full of fluid and coagulated blood. Both tubes had ruptured posteriorly, and in the effused blood were two escaped ova, about the size of large walnuts, one on either side, with roughened villous surfaces. The tubes were removed, an abdominal toilet was performed, and the wound was closed. After a rise of one and a half degrees of temperature on the second and third days recovery was uninterrupted.

The only similar case that I have been able to discover was one that was published in the *Journal of the American Medical Association* for June 26th, 1926 (p. 1979), by Dr. F. E. Clow. The clinical history resembled that of my case, but the termination was fatal, owing to an intercurrent attack of pneumonia. I hope the publication of these details may elicit the views of others with wider experience.

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Birkenhead General Hospital.

British Medical Association.

CLINICAL AND SCIENTIFIC PROCEEDINGS.

OXFORD DIVISION.

Cardiac Dyspnoea.

The sixth meeting of the year of the Oxford Division was held at the Radcliffe Infirmary on October 25th, when Dr. Collier, sen., took the chair, and Professor F. R. Fraser read a paper on some aspects of cardiac dyspnoea.

Professor Fraser said that dyspnoea was a very common symptom in patients with heart failure, several different types being known. In mitral stenosis it was severe and accompanied by orthopnoea and cyanosis in comparatively early stages of failure, while in aortic valve disease and myocardial degeneration comparable severity of dyspnoea with orthopnoea and cyanosis was found only in the late stages of failure. The cyanosis of mitral stenosis in the early stages of failure was of a brighter and redder colour than that in the late stages of myocardial degeneration, which was of a more leaden hue. The respirations in cardiac failure were shallow and rapid, and quite unlike the slow deep breathing of uraemia or diabetic coma. Periodic breathing was found in older patients with arterial disease and myocardial degeneration, and was not common in congestive failure. Paroxysmal dyspnoea occurred usually at night; it might prove fatal. Dyspnoea was a subjective phenomenon, and was due essentially to the individual becoming aware of the respiratory movements. This consciousness which caused distress might result from an increase in the respiratory movements or from a diminished efficiency of the apparatus so that normal ventilation could not be carried out without the individual becoming conscious of it. Both factors might enter into the production of dyspnoea, and there would then be both increased ventilation or hyperpnoea, and diminished efficiency of the pulmonary apparatus. In investigating the cause of dyspnoea these factors must be considered separately, and a search be made first for possible causes of hyperpnoea. In older patients there were frequently complicating factors such as pulmonary or renal disturbances, and simple cardiac dyspnoea could be best studied in the younger patients with mitral stenosis and auricular fibrillation, who were severely dyspnoeic even when at rest in bed. A study of the arterial blood in such patients had shown that there was an absence of such factors as insufficient oxygenation, excess of carbon dioxide, or raised hydrogen-ion concentration in the blood supplied to the respiratory centre to account for the increased respiratory activity. On the other hand, the arterial blood manifested the results of over-ventilation of the lungs with washing out of carbon dioxide, and indicated the presence of some stimulus to overaction at the centre which was independent of the quality of the arterial blood. When lung complications were present there might be carbon dioxide retention and inefficient oxygenation of the arterial blood, and when the patients were near death or in very severe failure there might be a raised hydrogen-ion concentration in the arterial blood from renal disturbances which would act as additional stimuli to the centre. It appeared probable that in heart failure the minute volume of the circulation was reduced, which would cause anoxaemia at the respiratory centre even when the arterial blood was fully oxygenated; evidence was given in support of the view that this was the fundamental cause of increased breathing in cardiac dyspnoea. The slow circulation in mitral stenosis and in the late congestive failure in myocardial degeneration resulted also in a lowered vital capacity, so that the pulmonary apparatus was not so able to meet the demands of the centre for increased ventilation, and consciousness of respiratory effort or dyspnoea resulted. Orthopnoea could be explained by the lowering of the vital capacity in the prone position, and the shallow and rapid type of breathing by the limitation to the depth of breathing caused by the pulmonary congestion. The explanation offered for cardiac dyspnoea would account for the different incidence of orthopnoea and cyanosis in the various types of failure. Anoxaemia at the centre was the essential cause of periodic breathing; this

anoxaemia was present in all forms of heart failure, but the rarity of this type of breathing in congestive failure was probably associated with the necessity for free pulmonary ventilation in the production of the alternating phases of apnoea and hyperpnoea. The peculiar features of paroxysmal dyspnoea or cardiac asthma were described, and especial attention was directed to the beneficial action of morphine in ending the attacks. A study of these paroxysms suggested that in certain circumstances dyspnoea might be a dangerous reaction which might drive a damaged heart to final failure, and that morphine should be used more freely than was customary in the treatment of dyspnoea. The danger in the use of morphine was that it depressed the respiratory centre, so that an increase in the anoxaemia might result from inefficient oxygenation of the blood in the lungs. When the centre was fatigued this danger would outweigh the benefits, but if the methods for administering oxygen were improved the use of morphine in the relief of dyspnoea could be greatly extended.

Extensive Oedema of the Foot.

Mr. GIRDLESTONE showed a girl, aged 18, who had been sent to him by Dr. Frankland West in 1923, with the whole leg and foot intensely swollen and oedematous, and severe pes cavus. There had previously been ulceration of the foot which was suggestive of perforating ulcer. The condition had been coming on gradually for a long time. It was later elicited that the girl had cut the sole of her foot some years before. She had never been abroad, no filaria were found in her blood, and there was no history of streptococcal lymphangitis nor of any streptococcal infection. At that stage no warmth of the foot was noticed. The oedema yielded slowly to elevation, the claw-foot remaining. She was admitted to the Wingfield Hospital last March and an operation was performed including tenotomy of the short muscles of the foot, wrenching with Thomas's wrench, amputation of small toe of the left foot, filleting of the fourth toe, transplantation of the extensor proprius hallucis to the neck of the first metatarsal, and arthrodesis of the interphalangeal joint of big toe. No abnormalities of the tissues were discovered. The foot healed well, but soon after removal of plaster and the resumption of walking in an ordinary shoe a perforating ulcer appeared under the third metatarsal head. This had persisted to the present, there being a slight sero-purulent discharge from it, but no granules. The foot was now felt to be hotter than the other, and there was considerable oedema of the foot and leg again. The *x*-ray picture showed extreme rarefaction of the fourth and fifth metatarsals with pathological fracture of the neck of the fourth, and some fungating bone round the fourth and fifth metatarsal heads. All this time the patient walked perfectly, and without any pain whatever. This latter point in particular, together with the *x*-ray picture, indicated the possibility of a trophic condition associated with some lesion of the central nervous system. Recently Dr. A. G. Gibson had found no sign of such lesion; he had, however, suspected the possibility of mycetoma (Madura foot). He had taken a culture from the depth of the sinus and grown a mould.

Dr. N. WATERFIELD stated that he had seen a large number of Madura feet, in the Sudan, but none resembling this. There had never been such extensive oedema and the lesion had been much more localized.

Pathological Specimens.

Dr. GIBSON showed (1) A small carcinoma occluding the lumen of the common bile duct near the entry of the cystic duct, which had caused an enlargement of the gall bladder and extreme jaundice. In the hepatic ducts there was a general cholangitis with abscess formation throughout the right lobe of the liver. The patient had died from cholaemia and suppression of urine. (2) A heart from a man aged 63, which showed a healed patch of ischaemic necrosis with marked absorption of the inner part of the wall of the left ventricle in the field of the descending branch of the left coronary artery, which, though patent at its origin and for 1½ inches from its origin, became extremely narrow and admitted only a pin. The main branch of the left coronary artery was blocked by a recent clot. The patient had had four years previously a cardiac attack, with breathlessness, pain, and cyanosis, from which he had completely recovered, except for slight attacks of thoracic discomfort. He had had a similar attack a few days before death.

Reports of Societies.

PAINLESS CHILDBIRTH.

At a meeting of the North of England Obstetrical and Gynaecological Society in Liverpool on October 28th, the President, Professor W. FLETCHER SHAW, in the chair, Mr. S. GEORGE WILSON (Liverpool) read a paper on "twilight sleep."

Mr. Wilson said that he had investigated the question of scopolamine narcosis on the lines recommended by the committee appointed by the Section of Obstetrics and Gynaecology of the Royal Society of Medicine in 1917. He had treated a series of 32 cases, which included 16 primiparae and 16 multiparae. He considered his results under the various heads adopted by the committee. To exclude sensory impulses a quiet room was selected which could be darkened. Cotton-wool soaked in oil was placed in the patient's ears; she was kept in bed and discouraged from talking, conversation being carried on in whispers. Observations were made, and the delivery performed, by the light of a small shaded lamp. The injections were commenced in primiparae when the cervix was dilated to the size of two fingers, and in multiparae when labour had definitely commenced. The first injection consisted of omnopon grain 2/3 (Roche) and scopolamine hydrobromide grain 1/150 (B. and W.). Each subsequent injection consisted of scopolamine grain 1/450, and in no case was the omnopon repeated. The second and third injections were given at hourly intervals. Subsequent injections were given at longer intervals—from one and a half to two hours, according to the condition of the patient. If labour ceased entirely, as it did in four cases, the injections were withheld until it recommenced. The average number of injections was 4.5. Injection of pituitary extract was employed in 17 cases (9 primiparae and 8 multiparae) chiefly in the second stage to augment the expulsive contractions of the uterus. The amount of pituitary for a single injection never exceeded 0.25 c.cm. In primiparae the average duration of labour was fourteen hours forty-five minutes, and the proportion after commencement of treatment was five hours forty-one minutes. In multiparae the average duration of labour was sixteen hours twenty-six minutes, and the lapse of time after commencement of treatment was six hours five minutes. The longer period in multiparae was explained by the exceptional length of some of the labours. In all but two cases the uterine action was altered by the injections, lengthening of the intervals between the contractions being the chief alteration. The strength and duration of individual contractions were also diminished. These changes were most marked between the second and third injections during the second hour, and were ascribed to the action of the omnopon, for in the majority of cases the pains increased again in force and frequency to culminate in expulsion of the foetus. In four cases labour ceased altogether during the treatment, in one case for eighteen hours, another for six, and in two others respectively for four and two hours. Voluntary expulsive efforts did not arise automatically, but as a rule the patient made them when instructed to do so. The pulse and respirations were unaltered. Observations on the blood pressure during labour did not show any relation between the height of the blood pressure in millimetres of mercury and the character and frequency of the uterine contractions; it was noted that, as a rule, the blood pressure tended to fall during labour. Thirst was noticed invariably and nausea occurred in a few cases; some of the patients complained bitterly of the pain, especially in the second stage. Sleep between the pains was present in every case;

slight restlessness and a moderate amount of mental confusion were noted as being associated with the uterine contractions in the most successful cases. Marked restlessness, difficult to control, and tending to occur in periods of uterine relaxation, was taken as an indication for postponing the next dose of scopolamine. Uncontrollable excitement was never seen. The pupils were normal and reacted to light. The corneal reflex was also normal. A key or a pair of scissors was usually the object shown to the patient for the memory test. The memory of the object was lost in only two cases, and recognition of the object shown was never at fault. General anaesthesia was only induced in five cases at the end of the second stage, in three cases for forceps extraction, and in two cases in which it was feared amnesia had been lost owing to the interval over which injections had been stopped when labour had ceased. Delivery of the child was spontaneous in all but four cases, when forceps were used; two of these patients were multiparae with contracted pelvic outlets, and two primiparae, one with twins, and the other with poor pains and a rigid perineum. In the latter cases analgesia was so good that an anaesthetic was unnecessary. In one case the placenta was delivered by Credé's manœuvre. In nine cases it was noted that haemorrhage associated with the third stage was more than usual, but it was never excessive. In one case the child was stillborn; this occurred in a primipara with premature rupture of the membranes, and weak pains. In the other cases the children were born alive and were discharged healthy. In most cases the child showed varying degrees of apnoea, but cried sooner or later on being left alone in a warm place. All the babies were thirsty for the first twenty-four hours. Sleep after delivery was encouraged, and it was found that the better the sleep the more successful was the case. The establishment of amnesia only was attempted, as the condition of analgesia signified too great an intoxication. "Islands of memory" were produced by stimuli being apperceived during a lessening of the amnesia. The memory test was valueless, however applied. The best guide was the condition of the patient between the pains, and her reaction to uterine contractions. The optimum condition was that of somnolence between the pains, with a moderate degree of restlessness and muttering delirium associated with the uterine contractions. The cases fell into three groups: (1) complete amnesia when the patient remembered nothing of the labour (17 cases); (2) incomplete amnesia when the patient had islands of memory formed and remembered incidents during the labour (12 cases); (3) failed amnesia (3 cases). During the puerperium the condition of the patient was markedly better than in normal cases, and there was less exhaustion. Three cases of pyrexia occurred in association, respectively, with pyuria, suppuration of the perineum, and retention of membrane with delayed involution of the uterus. Lactation was normal in all cases. Mr. Wilson concluded that this treatment was very good for the mother, lessening the mental and physical strain of labour, but it exacted unremitting attention from both the medical practitioner and the nurse. The uterine action was definitely diminished, and so labour tended to be prolonged. This might be counteracted, however, by the use of pressor substances, or by methods of artificial delivery. There was no danger, either to mother or child, if the effects of the injections were carefully observed. The memory test was useless. Strict precautions must be taken to exclude all adventitious stimuli.

The PRESIDENT said that twilight sleep had been much boomed when introduced twenty years ago. It then fell into disrepute, and the time had now come to take a clear and dispassionate view of it. He himself did not make use of it to any great extent. The great disadvantage was the amount of time involved.

Dr. LACEY asked if Mr. Wilson had noticed an abnormal number of persistent occipito-posterior positions of the vertex. He thought that the apnoea was due to delivery rather soon after the injection of morphine. He used ether at the end of the second stage to diminish the pain; and it also tended to stimulate the infant. He agreed that the use of pituitrin was necessary to excite the uterine contractions. He gave scopolamine grain 1/100 for the first dose, and grain 1/200 subsequently. A good nurse was essential and attention to the bladder was necessary.

Professor MILES PHILLIPS asked if the patients complained of dryness of the mouth. He said also that the preparation of scopolamine used was of importance.

Mr. WILSON, in reply, said that he had not had any persistent occipito-posterior positions in this series. He did not consider it was true "twilight sleep" if an anaesthetic was used. He had not had any patients who remembered their thirst during the labour.

Sequels of Radium Application.

Mr. W. W. KING (Sheffield) showed a specimen of carcinoma of the cervix arising in a case in which radium had been inserted for the treatment of menopausal bleeding.

The patient was a 2-para, aged 50. Four years before he had treated her with radium sulphate in the uterine cavity for menorrhagia due to a fibroid the size of a golf ball. The cervix was noted as healthy at the time. Five months ago a blood-stained discharge had commenced, which recently increased in quantity. A fairly advanced carcinoma of the cervix was found, and the uterus was removed by Wertheim's hysterectomy. The specimen showed that the cervix was occupied by an extensive growth, apparently a squamous-celled carcinoma, spreading on the surface of the cervical mucosa. The cavity of the uterus was practically obliterated. The fibroid present at the fundus was compact and cellular. The ovaries showed no ova in the cortex but marked hyaline changes in the vessel walls.

Mr. J. E. STACEY asked if any cervicitis had been noted as a result of the action of the radium before the onset of the carcinoma, and Mr. KING replied that there had been no symptoms of it.

Dr. LEITH MURRAY (Liverpool) showed sections of the endometrium and ovary after intrauterine radium.

The uterus and ovaries were removed from a nullipara, aged 39, who had had a full sterilizing dose of radium inserted into the uterus four months previously to induce the menopause for pain and menorrhagia. Persistence of the pain, due to endometrioma of the ovaries, led to hysterectomy. In the sections the endometrium was represented by an avascular disorganized layer, scarcely thinner than normal endometrium. A round-celled deposit was abundant, glands were wholly absent, and hyaline areas in the deepest layers and in the adjacent muscle were very obvious. The ovary, on the other hand, remained healthy, vascularized, but without definitely normal ova. A small part of the endometriomatous area seen in the section showed no degeneration. The difference between these sections suggested that the radium acted as a local and caustic agent on the endometrium.

The PRESIDENT asked whether it was generally believed that the action of radium introduced into the uterus was on the endometrium, or on the ovaries. Professor B. BELL asked what was the dose of radium given. He said that Dr. Forsdyke had proved that the action of the radium was produced by its destruction of the endometrium. Professor MILES PHILLIPS said that he had three specimens removed after radiation, which he had lent to Dr. Forsdyke, and which proved that radium exerted a destructive action on the endometrium and not on the ovaries. Dr. LEITH MURRAY said that he did not know the dose of radium used; it was said to be a "full sterilizing dose."

Foreign Bodies in the Genital Passages.

Mr. LEYLAND ROBINSON (Liverpool) showed the following specimens. (1) A taper and a crochet hook he had removed from the uterus in two cases of self-induced abortion. (2) A foreign body he had extracted from the vagina of a parous woman, seven months pregnant. The patient sat down violently on a pot of vaseline, which entered the vulva and became impacted in the upper part of the vagina, requiring an anaesthetic for its removal. (3) Two uteri, showing injuries to the cervix, from fatal cases of criminal abortion, alleged to have been procured by knitting needles. Mr. Robinson said that these specimens were intended to emphasize the importance of careful pathological investigation in cases of suspected criminal abortion. It was necessary to demonstrate the fact of pregnancy, and also to prove that a suspected injury was neither accidental in origin nor the result of disease. These points could only be determined by experts, and it was essential that this type of case should be submitted to a gynaecologist and a pathologist in addition to a medico-legal expert, who might be neither.

The PRESIDENT said that it was very difficult to decide what should be done from the legal point of view when one

was called in to similar cases. Dr. Donald asked what was the coroner's verdict in the two fatal cases of criminal abortion. In a similar case which he had treated, the patient died, and there was a verdict of *felo-de-se*. Professor B. Bell said that he had once had three cases of septic abortion at the same time which had all been procured by one person, whose name was given; all the patients recovered. He placed the evidence before the medical officer of health, who made investigations, collected evidence, and eventually stopped the activities of that particular person. Dr. MacMurray said he had had two fatal cases last year, in which he had informed the police. Mr. Leyland Robinson, in reply, said that the verdicts in the two cases were respectively (*a*) septic abortion and (*b*) septic abortion following self-inflicted injury. In a legal discussion Mr. Justice Avory had said that the police should always be informed. The British Medical Association had stated that the patient should be persuaded to inform the police. In practice he thought that if the patient recovered nothing was said.

Uterine Inversion.

Mr. St. George Wilson (Liverpool) showed a specimen of complete inversion of the uterus.

The patient, aged 30, was a three-gravida. A healthy male child was delivered with the breech presenting. Twenty minutes afterwards compression of the uterus was employed for bleeding, when the whole uterus and part of the vagina became inverted. The placenta was almost separated; it was removed, and the fundus uteri douched with hot lotion till it retracted. A tentative attempt at a reposition failed, and the patient was treated with morphine grain 1/4, saline solutions, and warmth for moderate shock. She died three hours later. The specimen consisted of the pelvis with the uterus and the vagina inverted, showing the broad and infundibulo-pelvic ligaments greatly stretched, and the ovaries and tubes out of sight in the cavity of the inverted uterus. There was no intraperitoneal bleeding, and the bottom of the pouch of Douglas was markedly raised.

Dr. F. H. Lacey (Manchester) also read notes of a case of inversion of the uterus.

A primipara, aged 23, was admitted to hospital suffering from an acute inversion which had occurred ten hours previously after an apparently normal labour. The midwife expressed the placenta, when the inverted uterus was noticed. The patient was in a condition of profound shock. After treatment of the shock, some hours later an attempt at reduction was made, but failed owing to oedema. Aveling's repositor was tried and failed. The patient had pyrexia for three months and had "white leg." She suffered from menorrhagia, and was in very bad health. Nine months later she was better, an attempt was made at replacing the uterus by incising the cervix and anterior wall of the uterus. This failed, until sutures were put in the fundus of the uterus, and were pulled up through an abdominal incision. Then the uterus was easily replaced, and the patient made a good recovery.

Professor Miles Phillips quoted the following figures. Of 184 cases collected from the *Lancet* and *British Medical Journal* up to 1912, 43 patients had died (23.4 per cent.). Of these 17 had died without treatment of any kind, usually before the arrival of a medical practitioner. Of those in which the condition had been left unreduced, often undiagnosed, and treated as chronic inversion, there were 49 cases, of whom two patients died of sepsis (4 per cent.). The body of the uterus had been twisted off and torn away by the midwife in two cases; both patients recovered. In the case of immediate replacement the figures were as follows:

	Cases.	Deaths.	Percentage.
Marked shock	79	24	30
No shock	23	0	0
Shock not mentioned (probably absent)	11	0	0

Replacement had been deliberately postponed until the shock had passed off in the case of one patient who recovered. In the *Lancet* and *British Medical Journal*, 1912-1926, there had been recorded 34 cases; four patients died (18.6 per cent.), one of these before the arrival of a medical practitioner. Seven cases had been left unreduced, some undiagnosed; they had been treated as chronic inversion without any fatality. The figures for immediate replacement in this series were as follows:

	Cases.	Deaths.	Percentage.
Marked shock	8	3	37.5
No shock	9	0	0
Shock not mentioned	3	0	0

Replacement had been deliberately postponed until recovery from shock in 7 cases without death ensuing in any of them. Professor Phillips thought that treatment of shock was essential before making an attempt at reposition. Miss Ivens said that she had seen a patient who had suffered from inversion twice. The President stated that he had seen three cases, one of which had been followed by puerperal sepsis and later by death due to intestinal obstruction caused by adhesion of a loop of intestine to the fundus of the uterus. In reply Mr. Wilson and Dr. Lacey said that they thought the shock was due to stretching of peritoneum, with possibly compression of the ovaries in the inverted uterus, and the treatment in the first place was that of the shock.

Concealed Accidental Haemorrhage.

Mr. W. W. King (Sheffield) read details of a case of concealed accidental haemorrhage treated expectantly.

The patient, aged 46, was eight months pregnant with her twelfth child. Fourteen hours before admission to hospital she suffered from faintness, repeated vomiting, and acute abdominal pains. On admission she was extrmely ill; the face was pallid, the mouth and tongue were dry, and the respirations were short, jerky, and rapid. The pulse, uncountable at the wrist, was 180 at the apex beat. There was a cloud of albumin in the urine. The uterus was tense, hard, and tender. The patient, who was a hopeless surgical risk, was given 500 c.cm. of defibrinated blood and 2.0 c.cm. of thromboplastin, and the blood pressure soon after was 100 mm. of mercury. Two hours later the blood pressure was 80; she was given another blood transfusion, and the blood pressure rose to and remained at 100. Labour then started, and she was delivered in four hours of twins with two pounds of blood clot. There was no post-partum haemorrhage, and recovery was uninterrupted.

In a paper read recently before this Society Mr. King had called attention to the fact that in concealed accidental haemorrhage the uterine muscle showed no histological evidence of disease or degeneration, and that it was functionally active and capable of strong contractions. The present case supported the fact of the activity of the uterine muscle and of the possibility existing in the expectant method of treatment of cases of concealed accidental haemorrhage.

Professor E. E. Glyn asked if the blood platelets had been counted in this case. He had found that they increased in number after confinement up to the eighth to tenth day. Dr. Willett believed that treatment should be expectant, though he had performed Caesarean section in one or two cases. Mr. King, in reply, said that the blood platelets had not been counted.

Squamous Carcinoma of the Uterus.

Dr. Leith Murray (Liverpool) described a case of squamous carcinoma of the cervix occurring five years after removal of the appendages. He first saw the patient, who was then aged 36 and a nullipara, in March, 1922, and removed both appendages for bilateral hydrosalpinx and bilateral cystic ovaries, together with a small subserous fibroid. In June, 1926, she complained of bleeding for three months, and was found to have a cauliflower growth of squamous carcinoma arising from the cervix which filled the upper part of the vagina. An extended Wertheim's panhysterectomy was easily performed, and two months later an application of radium was given. In six months there was a serious recurrence with ulceration into the rectum, and she died five months later. Dr. Murray asked if there was any direct connexion between the removal of the appendages and the development and degree of malignancy. He considered that the cauliflower type of growth was more favourable from the point of view of operability and prognosis.

Dr. Donald recalled a patient who had had both ovaries removed; she complained of vaginal bleeding, and he performed vaginal hysterectomy. She had had no recurrence in six years. He was of the opinion that the cauliflower growth was the most malignant, and Dr. J. E. Gemmell agreed.

Dr. Leith Murray, in reply, said he was amazed at the early recurrence, as there was no thickening in the broad ligaments, and it was a very easy operation to perform. He then reported a case of columnar and squamous

carcinoma coexisting in a uterus. The patient was a nullipara aged 53, in whom the menopause had occurred eighteen months previously. For four months she had had a foul blood-stained discharge. The uterus was enlarged and there was a nodule on the cervix believed to be a small retention cyst. A total hysterectomy had been performed four and a half years ago. She had had four treatments with radium, and had no recurrence. The specimen showed two different types of tumour: (1) a fungating growth in the corpus, and (2) a dense infiltration extending from the external os upwards for two and a half inches. Above there was a columnar carcinoma typical of that in the body, while lower down was the usual squamous-celled carcinoma with massive processes of squamous cells surrounded by considerable round-celled deposit. The nodule of the vaginal cervix was obviously an area of squamous carcinoma not yet broken down.

Oxyuris vermicularis Infestation.

Dr. C. P. BRENTNALL (Manchester) exhibited a specimen of *Oxyuris vermicularis* in the uterus. The organ removed by subtotal hysterectomy presented two small tubercles, one on the summit of the fundus, and the other near the right cornu. There was a strong band two inches long from the tubercle on the fundus to the colon. On section the tubercles were found to be soft and homogeneous, and microscopically each showed the presence of a female *Oxyuris vermicularis* surrounded by a very large number of eggs. The patient had had an abdominal operation for prolapse eleven years previously, and a vaginal operation for prolapse one year ago.

Mr. A. GOUGH asked what symptoms led to the hysterectomy, and Dr. BRENTNALL replied that the patient complained of menorrhagia, and he had found that the uterus was retroverted and fixed.

PREGNANCY AND PARTURITION WITH CARDIAC DISABILITY.

AT a meeting of the Liverpool Medical Institution on October 27th Dr. JOHN HAY and Dr. ELIZABETH HUNT contributed jointly a paper on pregnancy and parturition in patients with crippled hearts. The paper was based on a record of fifty consecutive cases, and its object was to correlate the dangers and difficulties of pregnancy and labour with the disabilities and disadvantages of valvular disease. In these cases the degree of valvular disease was graver than is usually met with in general practice. The fifty cases included 13 primiparae with three deaths, and 37 multiparae with two deaths. Mitral stenosis was present in 47 cases, and in 8 patients there was, in addition, some aortic regurgitation. Five patients were suffering from auricular fibrillation superimposed on the valvular disease. The problems discussed in the paper were as follows: the advisability of marriage in the presence of valvular disease; the termination of pregnancy in the event of conception; the manner in which pregnancy should be terminated; the best methods of affording relief during the stress of labour; and the management of the patient after the birth of the child. Consideration of the series showed the remarkable value of careful ante-natal treatment, which lessened the cardiac distress during pregnancy and robbed labour of many of its dangers. In the case of the five deaths, four patients had manifested indications of nephritis, which had come on shortly before labour, and was the factor responsible for death. A necropsy was obtained in two cases, and the nephritis was found to be of recent origin and of the parenchymatous type. It appeared that women with advanced mitral disease were liable to develop a typical form of parenchymatous nephritis as the result of pregnancy, and that this manifested itself late and greatly increased the gravity of the outlook. The record of these series of cases demonstrated the wonderful way in which patients responded to care and efficient treatment, and justified the taking of a much more hopeful view in dealing with this type of case than the one commonly accepted.

Reviews.

PRACTICAL PYELOGRAPHY.

SINCE Voelcker and Lichtenberg carried out the two first successful pyelographies in 1906 great strides have been made in this method of renal investigation, and what was at first merely a curiosity in medicine has now become a widely used method of diagnosis. Dr. ALEXANDER E. ROCHE's work[1] on the subject will, therefore, be of great use to the many surgeons who are now practising pyelography and who desire an up-to-date treatise on the subject. In his preliminary chapter on the history of pyelography the author deals with the various solutions that have been employed for the purpose of outlining the pelvis of the kidney. Most of the work on which the book is based has been carried out at St. Peter's Hospital, and after trying various solutions the author has come to the conclusion that a 12 per cent. solution of sodium iodide is to be preferred. But although sodium iodide is ideal in many respects, it lacks the antiseptic properties of sodium bromide and thorium. In order to make good this deficiency a 1 in 3,000 solution of mercuric iodide may be added. Stress is laid on preliminary aspiration before the injection of fluid, and great gentleness during the injections. If no pain has occurred after the injection of 10 c.cm. the author recommends that a picture should be taken in order to ascertain the degree of filling as a guide to the amount still required for injection. Provided scrupulous care be observed in the carrying out of pyelography, the method may be employed with a minimum of danger in all patients except those suffering from acute or severe chronic urinary sepsis, or from renal insufficiency.

Perhaps the most necessary adjunct of pyelography is that the surgeon should possess a thorough knowledge of the appearance of the normal kidney and of the varieties of pelves and calices that may occur. For this reason Chapter v, dealing with the normal renal pelvis, is probably the most important in the book. It is in mistaking a normal variation pelvis for an abnormality that the inexpert pyelographist usually goes astray, and we commend this chapter to his careful consideration. The concluding chapters deal with pyelographic appearances in such lesions as hydronephrosis, nephroptosis, neoplasm, renal infections, and congenital defects. To illustrate these various conditions excellent plates have been appended. In the selection of the pyelograms for reproduction judgement has been shown, and the text has been written throughout with commendable clearness. Finally, for those requiring further knowledge on the subject, a bibliography of the authorities quoted in the text is appended.

Dr. Roche's book is, we believe, the only British monograph on the subject, and it is fortunate that it has been written by one who is capable of clear expression and methodical arrangement and possesses excellent judgement. The pyelograms scattered throughout the book are excellent, and both the author and publishers are to be congratulated on its general turn-out. Altogether the book should be a welcome addition to the library of those who use pyelography, and even those who are not capable of carrying out such expert manipulations will find in its pages much that will be of interest and value.

[1] *Pyelography, its History, Technique, Uses, and Dangers.* By Alex. E. Roche, M.A., M.D., M.Ch.Camb., F.R.C.S.Eng. With an introduction by Sir John Thomson-Walker. London: H. K. Lewis and Co., Ltd. 1927. (Demy 8vo, pp. xiv + 118; 16 plates. 9s. net.)

THE TEMPERATURE IN TUBERCULOSIS.

IT is an axiom in medicine that the earlier a disease is recognized the better the chance of effecting a cure. It is for this reason that so much attention has been directed in recent times to the early diagnosis of disease, and it will be generally accepted that in no disease is early recognition of more importance than in tuberculosis. The little book on *The Significance of Temperature Variations* in

Tuberculous Disease,[2] by Dr. P. C. VARRIER-JONES, embodies a study of continuous temperature records of man in health and disease, and of cattle after the injection of tuberculin.

The book is really divided into three parts. The first deals with the mechanism of instruments for recording continuous and quasi-continuous temperatures, and the second with the application and value of such charts, especially in tuberculosis; the third part (Chapters 10 and 11) is a history of thermometry. The thermometer first used by Dr. Varrier-Jones was in essentials that devised by Gamgee, but later this was replaced by the electrical resistance thermometer of the Cambridge Scientific Instrument Company. The description of the instruments makes tedious reading and is not easy to follow.

The medical practitioner will wish to know something of the practicability, portability, cost, and usefulness of the apparatus, but on the first three points little or no information is given; nor are we told whether the patients object to its application for twenty-four hours in the groin or rectum.

The fourth chapter, in which normal temperatures are discussed, contains nothing novel, but is a record of the opinions and observations of others, though it is illustrated by some of the author's own charts. The fifth chapter deals with tuberculosis, and in it is defined a continuous temperature curve characteristic of tubercle. This curve, which can be produced by exercise or tuberculin, is said to be characterized "by a more or less rapid rise of temperature, 99° or more, a temperature which remains above 99° for a period of eight to twelve hours, the plateau commencing usually, though not invariably, about 2 p.m., and extending until 10, 11, 12 o'clock at night, or even later, when there is usually a sudden fall, often with, but sometimes without, a 'night sweat.'" This statement seems to contain the gist of the thesis maintained in the book.

The tuberculin test for cattle receives some attention; the author thinks that after injecting tuberculin it is easy to miss a rise or fall when the temperature is taken every four hours. Although this example is used to demonstrate the value of the continuous method, it does not seem to be suggested that veterinary surgeons should provide themselves with this complicated and delicate instrument for the purpose of making these tests.

A chapter is devoted to the value of the method in the early diagnosis and in the course of tuberculosis; it is well illustrated by many histories of patients in which temperature charts are reproduced, but it affords no real evidence that in early cases there are changes in the temperature before other physical signs are obvious.

Continuous temperature records may be of considerable scientific interest, but we believe that outside a laboratory or hospital they are not yet practicable. That they give information of value is obvious, since the highest and lowest temperatures of a patient in the twenty-four hours are rarely brought out by the ordinary thermometer. After reading the book we are left with the impression that the method is still in its infancy. The apparatus is complicated, requires to be standardized, and is cumbersome, and experience has taught that it is not without inconvenience to the patient. Unfortunately the book is not easy to read with comfort; the meaning is often obscure—for example, the following is typical. Speaking of characteristic curves, the author says:

> "A sudden fall is looked on as not only associated with the night sweat, but with the exhaustion of the patient induced by the tuberculin reaction; a process quite distinct from the disappearance of the pyrexia on the formation of a well defined cavity, the result of softening, and the evacuation of the caseous material—the tuberculinizing centre."

Nevertheless, Dr. Varrier-Jones makes some good points, and we would especially draw attention to the changes in the temperature curves in tuberculosis as the disease advances.

[2] *The Significance of Temperature Variations in Tuberculous Disease.* By P. C. Varrier-Jones, M.A.Cantab., M.R.C.S., L.R.C.P.Lond. Cambridge: Papworth Press, Papworth Village Settlement. 1926. (Demy 8vo, pp. 174; 61 figures. 5s. net.)

MACLEAN ON DIABETES.

Of the successful series, edited by Professor HUGH MACLEAN, of "Modern Medical Monographs," the first by himself on *Modern Methods in the Diagnosis and Treatment of Glycosuria and Diabetes*[3] was brought out in 1922, and is now in a fourth edition, a testimony to its popularity which almost absolves the reviewer from further comment. The revision of this edition provides the conclusions to be drawn from the more prolonged experience of the use of insulin. In connexion with the types of diabetes there is no doubt about the advisability of giving insulin to severe cases, cases with coma, and when in spite of diet ketonuria and well marked glycosuria persist, or about its danger in renal glycosuria, but there may be difficulty in deciding about elderly patients with much glycosuria though little or no ketonuria; in such circumstances the occurrence of any eye changes is an indication for insulin, as otherwise blindness may supervene. In cardiac degeneration and angina pectoris the employment of insulin is attended with great danger, and, if given at all, great care must be taken not to render the urine sugar-free, for a mild hypoglycaemic attack may set up angina, which is very likely to prove fatal. Professor Maclean points out that the anginal pains that patients have previously experienced may be mild, and that, nevertheless, many tragic results have followed the free administration of insulin to such patients.

The pancreatic preparations for oral administration which at present are flooding the market have been found to be without any effect on diabetes. The most recent preparation for oral administration, the synthetic product synthalin, undoubtedly diminishes the glycosuria and ketosis in some diabetic patients, but it has well marked toxic properties, and the gastro-intestinal and other disturbances thus excited prevent its use at present; possibly a somewhat similar product without these objectionable properties may be produced; in the meanwhile, however, insulin must be regarded as the only useful substance in the treatment of diabetes. Such is Professor Maclean's opinion, and it will have great weight with the clinician.

CORONERS' LAW.

It is almost a hundred years since Sir John Jervis compiled his treatise on *The Office and Duties of Coroners*.[4] The task of bringing the book up to date, in accordance with the Coroners (Amendment) Act, 1926, which came into force last May, has been undertaken by the coroner for the Liberty of the Tower of London, Mr. F. DANFORD THOMAS. He found the work of correlating the various Coroners Acts no easy one; and the difficulties were increased by the number of rules and orders which have been issued recently. The first part of the book contains the Coroners Acts of 1887, 1892, and 1921, the Amendment Act of 1926, the Infanticide Act of 1922, and the Births and Deaths Registration Act of 1926; explanatory notes are appended to many of the sections of the Acts. Mr. Danford Thomas then gives a very full account of homicide in all its forms; quoting numerous cases in which judges have laid down law and established precedents. Many of these pronouncements shed an interesting light on legal psychology; and though, no doubt, in general effect the principles are sound, in individual cases they must lead sometimes to curious inequalities of justice. In this connexion decisions that have been given in deaths during medical treatment, and from accidents on the highway, provide food for thought. At the conclusion of this portion of the book, the editor describes an historic inquest on a policeman killed in a Chartist riot in 1833. The public was so pleased with the coroner's jury for finding a "glorious verdict of justifiable homicide," that silver cups were distributed to the seventeen jurors. One of these cups is now in Mr. Danford Thomas's possession.

[3] *Modern Methods in the Diagnosis and Treatment of Glycosuria and Diabetes.* By Hugh Maclean, M.D., D.Sc., F.R.C.P. Modern Medical Monographs. Fourth edition, revised. London: Constable and Co. 1927. (Demy 8vo, pp. xi + 212; 10 figures, 13 charts. 12s. net.)

[4] *Sir John Jervis on the Office and Duties of Coroners.* Seventh edition, edited by F. Danford Thomas, M.A.Oxon. With an historical introduction by F. J. Waldo, M.A., M.D.Cantab. London: Sweet and Maxwell, Ltd., and Stevens and Sons, Ltd. 1927. (Roy. 8vo, pp. xvi + 364; 2 plates. £1 1s. net.)

It appears that Sir John Jervis was responsible for the opinion that coroners were *ex officio* justices of the peace. In this he would seem to have been confusing "conservators of the peace" with "justices of the peace" as at present understood. The Coroners' Society has stated that in its opinion "a coroner should not act as a magistrate unless specially appointed and sworn in at quarter sessions." An interesting historical introduction to this seventh edition of Sir John Jervis's book has been written by Dr. F. J. WALDO, coroner of the City of London, in which he traces the origin of the ancient office of coroner, and describes the powers and duties of the various kinds of coroner still existing or recently abolished. Since the passing of the Coroners (Amendment) Act Dr. Waldo becomes one of very few remaining authorized "franchise" coroners. If and when the King relinquishes the power to appoint coroners for the Isle of Wight and the Duchy of Lancaster Dr. Waldo will share the distinction with the King's coroner, the coroner of the King's Household, and the coroner for the Isles of Scilly alone.

It is naturally too early to expect Mr. Danford Thomas to express an opinion on the working of the Coroners (Amendment) Act. But there is one point to which Dr. Waldo drew attention at a recent inquest. Discretionary powers are now given to coroners, in cases of sudden death from unknown cause, to order a *post-mortem* examination, and, if satisfied with the cause of death suggested by the doctor, to dispense with an inquest. Dr. Waldo stated that his experience in the past twenty-seven years had convinced him that in such cases of sudden death the public interest was best served by a full necropsy followed by a public inquest in the presence of the relations, with the doctor and witnesses on oath. A jury might generally in these cases be dispensed with; but the relatives would be given the opportunity of examining the witnesses, and would be unable to feel that they had a grievance. In his comment on this discretionary power Mr. Danford Thomas says that "it will throw grave responsibility upon the coroner; and not only will equally careful inquiries have to be made by the coroner's officer of all persons about the deceased at the time of death and the circumstances generally, but the coroner should, as far as possible, make himself acquainted with the character, attainments, and reputation of the medical men in his district, and it would be undesirable to allow *post-mortem* examinations to be conducted at private houses; and, further, as the report from the medical man is not to be given on oath and an inquest held, it is better in known cremation cases to have the examination made by a medical man not in attendance on the family, but circumstances alone would determine whether this course should be followed generally." It would seem, therefore, that the wise coroner will not make much use of this discretionary power.

Mr. THOMAS OTTAWAY'S *Law and Practice relating to Coroners*[5] is a compact and complete little textbook of the special knowledge essential to coronership. The general reader will also find much interesting information in the book. Thus he will learn that in outlawry, which is now obsolete in practice, it is the duty of the coroner to attend at the final court and pronounce judgement of outlawry against a defendant in default; and that while a man is "outlawed," a woman is "waived." Sunday is a lawful day to the coroner for ministerial acts, but not for judicial duties. He may hold an inquest in the open air if necessary, but not on licensed premises where other suitable premises have been provided for the inquest. Treasure trove is, as a general rule, returned by the Lords of the Treasury to the finder, provided that he has reported his discovery promptly, and handed over the treasure to the proper authorities, but coins and other objects required for national or other institutions are retained, and the finders receive such sums as the institutions pay as the antiquarian value of the objects, less a percentage deduction. Mr. Ottaway describes the fineness of the line between murder and manslaughter; whether the provocation received is sufficient to reduce the charge to the milder finding; whether, in fact, the provocation is such as would deprive a reasonable man of self-control. Another word in which fineness of distinction has recently become emphasized is "negligence." The development of motor traffic, by increasing road accidents, has made the definition of negligence necessary for the purpose of sustaining a finding of manslaughter. The negligence must have been gross, wilful, and unlawful, with absence of all reasonable care, and something more than mere inadvertence. For the motorist, we are afraid, homicide is somewhat of a gamble, since, in the absence of any authorized rule in driving, the definition of negligence is subject largely to the mood and inclination of the judge. Mr. Ottaway's book, being a textbook, contains very little in the way of expression of opinion.

[5] *The Law and Practice Relating to Coroners.* By Thomas Ottaway, Solicitor and Notary, Coroner for Hertfordshire. London: Butterworth and Co., Ltd., and Shaw and Sons, Ltd. 1927. (Demy 8vo, pp. xiv + 119 + 13. 10s. 6d. net.)

MALARIA IN INDIA.

THE output of published work, the result of observation and research in India, yearly becomes larger in amount and greater in importance. Among the number of valuable books which have appeared during the current year the volume on *Malaria in India*,[6] by Major-General Sir PATRICK HEHIR, stands by itself, perhaps, in that in the width of its scope it forms a monograph for reference, while in its practical detail it will serve as a textbook for the malariologist in the field.

In the preface the author states that the new volume has grown out of his *Prophylaxis of Malaria in India* (1910), which, revised, enlarged, illustrated, and brought up to date, is incorporated with it, and he invites particular attention to the sections on the economic and sociological questions connected with malaria in India, and the economic problems concerned with quinine. The book is, indeed, the author's message to India, after twenty-five years' work on one of her biggest problems.

The scope of this work may be gathered from the arrangement of its contents. Part I (pp. 1-177) is divided into sections on the prevalence of, mortality from, geographical distribution of, contributory causes of, personal predisposing causes of, immunity to, role of man in the distribution of, malaria in India; epidemic and incidental malaria; the human malaria carrier; Indian anophelines and their habits; the malarial parasites of man; and includes a malaria map of India created by Lieut.-Colonel Christophers. In Part II (pp. 177-242) the malarial fevers, the clinical and chemical pathology, and the pathological anatomy of malaria, together with the treatment, are dealt with; in Part III (pp. 245-450) are discussed the methods of prevention of malaria in India, segregation of the healthy, isolation of the infected, notification and legislative measures, with a very full disquisition on the use of quinine. The subjects next in order are mosquito control in detail from various aspects, with special sections on malaria prevention in towns, in villages, in schools, in houses, in military cantonments, in jails, in industrial works, and in the individual, with, lastly, chapters on malarial surveys, education, expenditure, and economic and sociological questions connected with malaria in India.

Throughout the author refers to the investigations and writings of others, so that with his own observations and criticisms we have a most comprehensive treatise on the whole subject, and one brought well up to date in all sections.

Without attempting to go into detail we may refer to two sections to which the author has himself called attention. The question of the provision of quinine or other similar product in sufficient quantity and at a sufficiently low price is a problem of the first magnitude when considering the treatment of the cases of malaria which occur annually in India. They are estimated to number one hundred millions. Sir Patrick Hehir urges that, until such time as some synthetic product may replace quinine, the Government should own cinchona plantations, control manufacture, and regulate the distribution and sale of the drug. The chapter on the economic and sociological questions

[6] *Malaria in India.* By Sir Patrick Hehir, Major-General, K.C.I.E., I.M.S.(ret.). Oxford Medical Publications. London: Milford, Oxford University Press. 1927. (Roy. 8vo, pp. xix + 490; 109 figures. £2 2s. net.)

connected with malaria in India is extremely interesting. Malaria in India is not a problem to be measured by so many pounds of quinine, so many yards of mosquito netting, so many chains of drains, or so many gallons of kerosene—it is a problem bound up with the general rural economic conditions in the widest sense, with the people, their habits and customs. The author's rapid survey of these conditions gives evidence of a lack of understanding of some of these big problems in the government of India in the past, but at the same time gives comfort in that "excellent foundations are being laid" which "will produce results that will surprise the people themselves within the present generation."

We have alluded to this book as the author's "message to India." The principle underlying that message—namely, that it is the duty of Governments by investigations along the widest lines to understand the peoples they govern and their conditions—is a message of the greatest importance to the world.

NOTES ON BOOKS.

A SMALL volume,[7] containing tables of foodstuffs, compiled by Drs. HERMANN SCHALL and AUGUST HEISLER of Königsfeld, has been received. It contains such particulars as the protein, fat, carbohydrate, water, and calorie content of animal and vegetable foods, drinks, made dishes, patent foods, infant foods, and diabetic preparations, the nutritional requirements according to bodily measurements in both sexes, and the amount of vitamins, cholesterin, cellulose, lecithin, purin bodies, and mineral substances contained in various articles of diet. The tables are numerous, and the volume seems to have no exact counterpart in English.

How to Feed the Family is a little pamphlet written by Colonel P. S. LELEAN, professor of public health in the University of Edinburgh, and issued at 6d. by the People's League of Health, 12, Stratford Place, London, W.1. Professor Lelean, in simple language, compares the human body to a motor car, which requires fuel, oil, electricity, and repairs, just as the body requires warmth and power, vitamins, materials for repair, salts, and water. Standard diets for a family equivalent to three men, in which hearts, herrings, and corned beef figure largely, are then given, from which each individual may obtain the requisite 3,000 calories, at a total cost of 19s. 8d. to 25s. 6d. a week. The prices stated for various foodstuffs are those obtaining in Scotland; but a list of the more important English variations is given, from which it is interesting to learn that oatmeal is cheaper in England. The pamphlet should be useful.

The Book of the Words of Tobit[8] has been brought out in an attractive form with a well written introduction, occupying more space than the Book of Tobit, from the scholarly pen of Mr. ERNEST H. SHORT, who has also edited the book of Revelations. Tobit and his only son Tobias were regarded as harbingers of good fortune to the blind, and in the fifteenth century many Tobit pictures were painted as votive offerings for blind men. Saint Lucia was regarded in the same way by women, for no other reason, so Mr. Short says, than the verbal association of the name Lucia (light) with the organ of sight, though the legend arose that this beautiful saint plucked out her eyes because a young Roman, inflamed by their lustre, gave her no peace from his attentions. The book is well illustrated by plates from the old masters, which Mr. Short pleasantly describes.

Major A. J. DAWSON is a well known devotee at the shrine of the dog, even as the Egyptian was at the shrine of the cat. Hence, perhaps, the copious libations of words in his *Letters to Young Dog-Owners*.[9] But his treatment of his subject is sound; and the would-be dog owner will find concealed in the letters all that he can want to know in the care and training of dogs. It would appear that Major Dawson's presumably imaginary correspondent found him reticent on the subject of health in dogs, meaning thereby the administration of medicine. The author hopes that his letters have insured the reader against any need for dog-doctoring; but he has failed to achieve the conciseness of a veteran dog breeder whom he quotes. This authority was asked by a newspaper editor (*a*) how to doctor dogs, (*b*) for a general policy and methods in disease and illness in dogs. His replies were: "(*a*) Don't; (*b*) avoid 'em."

A Dictionary of Bacteriological Equivalents[10] in English, French, German, Italian, and Spanish has been prepared by Mr. W. PARTRIDGE, F.I.C., and will be found useful by those who wish to study papers on bacteriology published in the foreign languages mentioned.

[7] *Nährungsmittel-Tabelle.* By Dr. Hermann Schall und Dr. August Heisler. Eighth edition. Leipzig: Curt Kabitzsch. 1927. (6½ × 9½, pp. 124. M.5.40.)

[8] *The Book of the Words of Tobit.* With an introductory Essay by Ernest H. Short and Reproductions of Paintings by the Old Masters. London: Philip Allan and Co., Ltd. 1927. (Demy 8vo, pp. vii + 120; 12 plates. 10s. 6d. net.)

[9] *Letters to Young Dog-Owners.* By Major A. J. Dawson. London: Philip Allan and Co., Ltd. 1927. (Cr. 8vo, pp. viii + 159; illustrated. 6s. net.)

[10] *Dictionary of Bacteriological Equivalents.* By William Partridge, F.I.C. London: Baillière, Tindall and Cox. 1927. (Post 8vo, pp. xii + 141. 10s. 6d. net.)

PREPARATIONS AND APPLIANCES.

EPHEDRINE AND SYNTHETIC EPHEDRINE (EPHETONIN).

A DESCRIPTION of the physiological action of ephedrine, obtained from *Ephedra vulgaris*, var. *helvetica*, by Dr. K. K. Chen of the Union Medical College, Peking, was published in our columns on October 1st (p. 593). It was then mentioned that the drug had been found useful in asthma as a bronchodilator. Ephedrine acts like adrenaline, but has the important advantages that it can be given by mouth and exerts a much more prolonged action than the latter.

Messrs. E. Merck have recently placed on the market a synthetic product, which they state is identical in chemical constitution with natural ephedrine—that is to say, it is phenyl methyl amino propanol hydrochloride ($C_{10}H_{15}NOHCl$). It is described as synthetic ephedrine, and has been given the trade name "ephetonin." The vendors claim that experimental and clinical trials have shown that ephetonin produces the same actions as ephedrine. The production of this drug in a synthetic form is an interesting advance in science. The London agents are Messrs. H. R. Knapp, Ltd., 3 and 4, Clement's Inn, Kingsway.

RUBBER SURGICAL GLOVES.

Messrs. Allen and Hanburys (48, Wigmore Street, London, W.1) have sent us a sample of india-rubber gloves, manufactured, they state, by a new process, which renders the rubber extremely tough, so that it may be subjected to sterilization under high-pressure steam. They claim that as the rubber is tougher a thinner glove can be used. The price is 2s. a pair, or 21s. a dozen. The gloves have been tested for us by a surgeon, who writes:

"I have operated twice with the gloves and find them quite satisfactory, except that their 'touch' is not quite the same as that of those I am used to. I understand that these gloves are made in London by means of a new process of vulcanization of the rubber, which renders them thin, tough, and durable, and better fitted to withstand repeated sterilization under high-pressure steam than the American gloves. The new gloves, owing to their greater durability, should effect an economy for general use in hospitals, and as they are of British manufacture I feel that they ought to be strongly and widely recommended. I found them a little more slippery to the touch than the Miller (American) gloves I am used to, but the pair sent were a little too large for me. This would be obviated by more experience in using them. I understand that it is necessary to order a slightly larger size, so that anyone wearing a 7½ would require an 8."

CONCENTRATED DIPHTHERIA ANTITOXIN.

The Wellcome laboratories have for many years produced diphtheria antitoxin of a concentration of 1,000 units per cubic centimetre. Improvements in the separation of the antitoxin-bearing fraction of the serum have now made it possible to prepare a concentrated diphtheria antitoxin-globulin with a titre of 2,000 units per cubic centimetre. The significance of this achievement is indicated by the fact that the U.S.P.*x* only requires a minimal activity of 350 units per cubic centimetre for purified antidiphtheritic serum.

A SIMPLE PLEXIMETER.

Dr. I. Kovolman of Glasgow has invented a device made of vulcanite and shaped like a small spool to serve as a pleximeter in percussion. The inventor claims that by its use lesions can be more accurately localized in the chest and that it is very satisfactory in percussing the abdomen. He calls it the "phalangoscope," and it is a simple device; but in all pleximeters there must be some loss of that tactile sensation which is so informative in percussion when the finger is used. The apparatus is made by Thackray's, Great George Street, Leeds.

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SATURDAY, NOVEMBER 19TH, 1927.

PROSTATIC ENLARGEMENT.

In his Bradshaw Lecture to the Royal College of Surgeons, published in the opening pages of this issue, Sir Cuthbert Wallace reviews the present position of our knowledge of prostatic enlargement. The condition is so common and so embarrassing to the sufferer, who is often overtaken by it while still capable of useful work, that the lecture will be read with great interest by general practitioners, for it discusses practical problems with which they are often confronted. It will also, we feel sure, be carefully studied by specialists, for to those who are so immersed in the details of some particular field of surgery, that they find difficulty in appreciating the chief landmarks it is of no little advantage when one with the experience of Sir Cuthbert Wallace mounts a peak and points out the main features of the landscape. In some directions much progress has been made in the study of prostatic enlargement, and fortunately, this applies particularly to treatment; but, as the lecturer observes in his introductory remarks, our knowledge of the function and the pathology of the prostate remains more or less where it was at the end of the last century. Even when we come to the mechanics of prostatic obstructions there is little that can be asserted with any degree of confidence. In Sir Cuthbert Wallace's opinion no satisfactory explanation has yet been offered of residual urine and of the deterioration of the function of the kidneys that results from the obstruction. His suggestion that residual urine is really a result of bladder posture is ingenious, but may not at once carry conviction. His theory is that if the act of emptying the bladder is slow or interrupted the impulse necessary for carrying it to completion dies away. To some it will seem that this explanation exchanges one set of difficulties for another; we are still left wondering as to the cause that lies behind it all. In his effort to account for the ill effects of obstruction on the kidneys the lecturer, after showing that the commonly accepted view of back pressure is unsatisfactory, puts forward three possible explanations of the renal complications which follow; these are that the kidneys are extremely sensitive to any obstruction, that the damage done is in the nature of a sudden catastrophe, or that some cause must be sought for that is at present unknown. In other words, he has to admit that we are still completely in the dark.

It will be noticed that Sir Cuthbert Wallace lays very little stress on infection, either in speaking of the pathology of prostatic obstruction or in connexion with treatment. This omission, which was no doubt deliberate, is particularly striking when we consider that the chief direction the more recent efforts of operators have taken has been to attempt to reduce the harmful effects of infection on the convalescence of prostatectomized patients. Some surgeons believe that the chief danger of prostatectomy lies in the fact that it is of necessity a septic operation. In the hope of reducing this, new methods have been introduced with the object of allowing the field of operation to be directly inspected, and tags of mucous membrane and torn tissue to be removed so as to prevent their forming a nidus on which organisms may flourish. In the lecturer's opinion these efforts to reduce infection would appear to be unnecessary, and he is even inclined to regard irrigation of the bladder and of the prostatic cavity with antiseptic fluids as inadvisable. The lesson that he would teach is rather that the less the prostatic couch is interfered with after operation the better. He attributes his comparative freedom from secondary haemorrhage to the fact that he only resorts to washing out the bladder in exceptional circumstances.

In speaking of mortality he showed that in his own hospital (St. Thomas's) the mortality from prostatectomy during the years 1922 to 1926 was 14.5 per cent., and that when with the prostatectomy mortality that resulting from suprapubic cystostomy was included it was as high as 22.5 per cent. Even if we admit that patients suffering from prostatic obstruction are usually bad cases for operation, and that they have too often postponed seeking relief until threatened with renal failure, prostatectomy must still be regarded as an operation attended with very grave risks. A study of the causes of death following operation shows that the majority of patients die as the result of not one, but of several complications, of which sepsis would seem to be the worst.

The lecture is provocative of thought, and we shall not be surprised if it gives rise to some controversy. We could perhaps have wished that Sir Cuthbert Wallace, in concluding this valuable survey of prostatic surgery, had indicated the direction in which future improvement is to be expected. However gratifying the progress that has been made since 1886, it is impossible to remain satisfied with the present state of affairs. We may hope that some future Bradshaw lecturer will be able to record an advance in prostatic surgery at least as great as that described by Sir Cuthbert Wallace.

OXYGEN THERAPY.

The experience obtained during the war of the great value of oxygen in the treatment of gas poisoning did much to encourage its use in civil practice, and recognition of its importance as a therapeutic agent has increased considerably during the last decade. At the same time, it is notorious that the results of the therapeutic use of oxygen often are unexpectedly disappointing. Hence the papers on oxygen administration which appear in this number are of special interest.

The main principles which should govern the use of oxygen were set out clearly by Professor J. S. Haldane ten years ago.[1] Oxygen therapy is not likely to be found of much service unless these fundamental principles are clearly understood, and Dr. Whitridge Davies has done good service in restating them and in providing at the same time quantitative data which will facilitate their application in practice. The outstanding fact is, of course, that the normal alveolar air contains 14 per cent. of oxygen, and that oxygen cannot be expected to produce benefit unless sufficient is given to raise this proportion by a significant amount. Dr. Davies has supplied us with figures showing the actual effects on the composition of the alveolar air produced by varying quantities of oxygen given by various methods. His analyses reveal the rather surprising fact that administration of oxygen through a nasal catheter is no

[1] Haldane: British Medical Journal, 1917, i, 181. See also Journal, 1919, ii, 65.

more effective than delivery into a funnel held over the patient's mouth, and hence some form of mask is essential if the use of the gas is to be effective. His results indicate that the smallest rate of flow likely to produce benefit is about two litres a minute, and in this connexion he states that, when oxygen bubbles through water at the fastest rate at which the bubbles can be counted, the flow only corresponds to a quarter of a litre a minute, which is a quantity insufficient to produce any effect.

These conclusions are of great practical importance, for they suggest that the usual methods of giving oxygen are extremely inefficient, and further, that the gas is very frequently given at a rate which would be too low to produce an effect even if the method of administration were efficient. The discussion on the paper suggested, however, the great need for careful clinical tests of these conclusions. Dr. Hilton, for example, found that an oxygen flow of 0.75 to 1 litre a minute given by a nasal catheter might produce distinct benefit in certain cases.

The main physiological principles involved in the administration of oxygen are very simple, but the clinical applications of these principles are complex because of the great variety of the conditions that lead to anoxaemia. Even in a single disease such as lobar pneumonia we must assume that many degrees of impairment of the alveolar epithelium exist in those portions of the lung still functioning, and it is probable that in some cases a very small rise in alveolar oxygen tension may just make the difference between sufficient and insufficient aeration of the blood.

An important point mentioned by Dr. Ritchie was that in pneumonia "the faintest trace of cyanosis in the lips, ears, or nose is a call for oxygen." Professor Haldane has repeatedly emphasized the fact that oxygen should be given early before pronounced cyanosis occurs, because severe cyanosis will quickly produce irreparable injury to the vital organs. Dr. Davies did not discuss the use of subcutaneous injections of oxygen, but it is difficult to understand how these can produce much benefit. In the first place, an adult at rest requires about a quarter of a litre of oxygen a minute, and therefore the amount that can be introduced subcutaneously is negligible compared with the amount the body is using. In the second place, the oxygen will be taken up by the capillaries, and will only increase the oxygen tension in the local tissues and in the venous blood, whereas the object of oxygen therapy is to increase the oxygen tension in the arterial blood which goes to the vital organs.

It is perhaps fair to say of our present knowledge of oxygen therapy that the main physiological principles involved are fairly well established, and that what is chiefly needed is more clinical information, based on accurate measurements, to determine over what range of dosage oxygen can produce measurable benefit in actual cases of disease.

In his final paragraphs Dr. Davies touches on another very important point—namely, the possible value of oxygen in the treatment of chronic respiratory diseases. Professor Barcroft and his fellow workers produced very remarkable permanent benefit in patients suffering from chronic after-effects of gas poisoning, by treating them for a few days in an oxygen chamber. This method of treatment, unfortunately, is expensive, as it involves a specially constructed chamber and large quantities of oxygen, but a full investigation of its possibilities is obviously desirable in view of the serious economic loss caused by ill health due to chronic respiratory diseases in the adult population.

TREATMENT OF RECTAL CANCER BY RADIUM.

Radium has had an uphill fight for recognition, and may be said to have made good in spite of the enthusiasm of its early supporters, many of whom advanced claims unjustified by the true facts. Recent developments—largely the outcome of the closely co-ordinated team work of some of the Continental clinics—have now placed radium therapy in such a position that, in regard to two or three at least of the common kinds of cancer, it is beyond all question an important alternative to operative treatment.

Cancer of the cervix uteri and cancer of the lip and tongue have furnished so far the most convincing body of evidence as to the value of radium; and although there is not yet complete unanimity—possibly owing to the fact that there are still some surgeons who have either not had or not taken the opportunity of seeing what is being done—there certainly is an ever-increasing body of authoritative opinion in its favour, composed of those who have actually seen the results obtained in London, Manchester, Stockholm, Paris, Brussels, and many other centres. All these successes would appear to have followed upon the introduction of the radium needles, and the appreciation of the fact that in order to obtain good results the radium-containing needles must be inserted actually into the substance of the growth, and must remain there a considerable time. It is easy to understand, therefore, that the more accessible the growth the better the results, and that cancer in those situations to which access is difficult has not been attacked with the same energy and enthusiasm.

Cancer of the rectum has suffered in this way, for not only are there considerable technical difficulties attending the mere insertion of the needles, but an accurate estimate of the size of the growth is difficult to arrive at by the ordinary methods, and in consequence the dosage is largely a matter of chance. On November 9th, at a meeting of the Subsection of Proctology of the Royal Society of Medicine, Sir Charles Gordon-Watson described a method of radium treatment of cancer of the rectum by open operation. Briefly, it consists in exposing the rectum by a posterior incision extending from the sacrum to the anus, the coccyx being removed in order to allow adequate space for the manipulation necessary to estimate the size and extent of the growth, and to assess the dosage indicated. The radium is employed in needles varying in length from 2 to 5 cm., which are so placed as to ensure that every part of the growth and its extensions receives a "barrage" of gamma rays of equal intensity. Roughly speaking, the general aim is to ensure that every cubic centimetre of growth shall have at least 2 mg. of radium acting upon it for a minimum period of seven days. The method embodies, therefore, the general principle of a small dose for a prolonged period, as opposed to the earlier and more general principle of a heavy dose for a short time. The speaker was able to show two patients in whom this plan of attack had been employed with such success as to cause complete disappearance of any evidence of cancer, the growth having been replaced by a fibrous stricture.

This development of the "surgery of access," which is now so important a factor in radium treatment, is clearly of the greatest value, and Sir Charles Gordon-Watson is to be congratulated upon his enterprise and upon the success that has attended his efforts.

TREATMENT OF EARLY MENTAL DISORDER.

The treatment of mental disorder, whilst comprising all those methods employed in the relief of physical disease, has of necessity to include much more; and the psychological element must, in most cases, bulk largely in all therapeutic measures taken for the relief of mental illness, both as regards a constant sympathetic supervision and a deliberate employment of direct suggestion. It is only necessary to compare the serviceableness of a medical or surgical out-patient department with that of a mental out-patient clinic to realize the difficulties which confront the alienist when treating as out-patients those suffering from mental disorders. In the third annual report of the Maudsley Hospital Dr. Mapother, the medical superintendent, draws attention to this difficulty. "In regard to treatment proper," he says, "it remains true that available wards are equally indispensable to the real efficacy of an out-patient clinic. In their absence such a department receiving a mixed clientele would be reduced to the absurd position of being quite impotent in respect of a large part of its most hopeful cases. It would be easy, and in the present state of public feeling very dangerous, to exaggerate the extent to which out-patient treatment alone will suffice. The adequacy of such treatment alone is confined to a relatively few classes of 'functional' cases. . . . In general it may be said that out-patient treatment (by which most often one means psychotherapy) may be adequate (for example, in states that are mainly obsessional) or even preferable (as in many cases with a large element of chronic hysteria), but it is generally quite inadequate for patients showing any considerable disturbance of emotion or activity, and this quite apart from whether such disturbance renders the patient dangerous to self or others." So it comes about that the employment of intensive psychotherapeutic measures, so essential in a large number of cases, is necessarily limited to a small number of chosen patients who for some reason cannot be admitted, but who are otherwise of exceptional promise. If, however, the treatment of mentally disordered patients is impracticable on a large scale in an out-patient department, and has perhaps fallen short of the expectations which many held of it, the treatment of such patients in the wards of such a hospital as the Maudsley holds out bright promise for the future, both as regards the enlargement of our knowledge of mental disease and the treatment of its many manifestations. We have come to consult the Maudsley annual reports as an authoritative source of information, both in the matter of diagnostic measures and therapeutic measures in the treatment of mental illness; and all the more so that Dr. Mapother has from the first assumed a modest scepticism of outlook which makes us accept unhesitatingly his positive findings. The treatment employed at the Maudsley Hospital includes general treatment by established methods, and special treatment, much of which, although experimental, raises great hopes. Amongst the established methods of treatment carried out are hydrotherapy, physiotherapy (including Swedish drill, massage, and special exercises such as Fraenkel's), electrotherapy, and special and occupational therapy. Among the methods of treatment used recently are the induction of relapsing fever in neurosyphilis; the infective material was supplied to Dr. Golla, director of the pathological laboratory, by Dr. Plant of Munich. It is too early yet to speak of results. In the meantime Dr. Mapother is content to observe that the prognosis of all forms of neurosyphilis is being modified as a result of treatment by induced pyrexia and by tryparsamide; he favours a combination of the methods. Ultra-violet radiation has been followed by improvement in a number of cases. Of the various medicinal preparations which have been employed, ergot has brought about considerable benefit in cases with anxiety symptoms, and collosol manganese and afenil (a preparation of calcium chloride combined with urea) are being tried, but so far without definite results. Somnifen has been extensively used, and is, in Dr. Mapother's opinion, the best diurnal sedative for seriously agitated and hallucinated patients. In such cases it can be so administered by hypodermic injection as to produce a sort of twilight sleep. The complete recovery of confused and hallucinated cases after particularly long treatment with somnifen has convinced Dr. Mapother that its use is not attended by the risk of producing dementia. Dr. Mapother, Dr. Golla, and their colleagues and helpers are tilling a difficult field. Positive results are not easy to come by; but their courage and skill are such that we believe a rich harvest awaits them and us.

THE ORTHOPAEDIC HOSPITAL IN LONDON.

When the spacious and then new out-patient department of the Royal National Orthopaedic Hospital in Bolsover Street, Marylebone, was opened in 1909, it was not anticipated that within twenty years it would be found quite inadequate. But at that time the out-patient attendances numbered only 16,285, and, although the provision made for increase then seemed generous, no one concerned foresaw that in 1926 those attendances would have increased to 77,559, or nearly fivefold. Not only are the attendances more numerous, but the need for more accommodation for treatment has increased in a greater ratio, seeing that in this, as in other hospitals, great developments have taken place in the last eighteen years in the scope of electrical and physiotherapeutic methods and of the application of radiography. In 1909, moreover, the hospital possessed no workshop of its own, but was dependent upon instrument makers for all the appliances required by patients. Despite all the advances in the operative treatment of deformities, a very large number of cases need retentive or corrective appliances after treatment, and these must be supplied before, or at least as soon as, the surgeon's work is done, if the good gained is to be kept. Such considerations convinced the committee of management of the hospital that they must establish their own workshop, where appliances could be made or modified under the direct supervision of the surgeon or other hospital officers. An extension of the site in Bolsover Street was obtained from the ground landlord, who was then Lord Howard de Walden, but at this juncture the war put a stop to all building on it for some years; soon after the peace a temporary workshop was established with the help of the Ministry of Labour, in which a number of disabled pensioners were trained rapidly and successfully in surgical bootmaking. With the support of the King's Hospital Fund the adaptation of the old out-patient department as a part of the new building was undertaken, and the whole work has been carried to completion at a cost of £58,500. It is in this addition that the president of the hospital, Prince Henry, K.G., will receive the Lord Mayor and sheriffs when, on November 22nd, the Lord Mayor will declare the department open. The spacious and airy out-patient waiting hall is decorated in a manner unusual in such places. Bold designs in colour representing the twelve months of the year, painted in oil on canvas and waxed, relieve the monotony of the walls, and give the too often weary eyes of the patient or his or her friends something pleasant and beautiful on which to rest. The artist, who presented the pictures, is Miss Nan West. The surgeons' rooms, dressing rooms, and other necessary apartments open on to the hall, which is well lighted from above. There is a well equipped out-patient operating theatre, as well as new accommodation for massage, the application of plaster-of-Paris, exercises, electrical treatment, light treatment, and *x*-ray work. The provision made in 1909 for the radiographic department soon proved absurdly inadequate. It is hoped that the accommodation and apparatus now provided for

this department may be sufficient for all needs for years to come. The very well equipped and extensive workshop is placed in the basement, and affords facilities for a greatly increased and improved production of surgical appliances and boots. This remodelled and enlarged out-patient department remains in communication by means of a tunnel under Bolsover Street with the main building and its 200 beds in Great Portland Street, which was opened by King Edward and Queen Alexandra in 1909. This also had become quite inadequate to the needs of the hospital, and soon after the war the responsible authorities decided that more beds were urgently needed, but that it would be unwise to attempt to provide them on a costly site and in the gloom of a great city. The country branch at Brockley Hill, Stanmore, was the outcome of this decision. This is placed in an ideal situation, 400 feet above the sea, and, although only ten miles along the Watling Street from the Marble Arch, in quite rural surroundings. Besides the old country house and a wooden open-air ward, permanent wards for open-air and sunshine treatment have recently been built and are on the point of completion, as well as a new surgical block; provision is made also for the most up-to-date treatment of surgical tuberculosis and other crippling maladies, thus raising the number of beds now available here to 266. These extensions have cost over £80,000, and, taken together with the new out-patient department, they have involved the charity in a debt of some £40,000. Three-fourths of the patients treated at the two hospitals are children, whose needs appeal with peculiar poignancy to the charitable, and it is hoped that this debt will be cleared off as soon as the needs of the institution are realized by the public.

SOME EFFECTS OF LIGHT.

A CONTRIBUTION to the knowledge of a subject of considerable general interest has recently appeared in an article by J. V. Supniewski, from the Pharmacological Laboratory, Cambridge, published in the *Journal of Physiology* (October, 1927). It is on the action of visible light on organs sensitized by haematoporphyrin. The action upon the tissues of short wave-length rays is becoming a subject of greater and greater interest, from the point of view both of theory and of practice. Visible light, on the other hand, has been shown to exert little action upon animal tissues, though, in the plant world, the phenomena of photosynthesis have long been familiar. It has, however, been shown that fluorescent substances, such as eosin, which give off rays of shorter wave-length than those which they absorb, can "sensitize" tissues and other material (for example, photographic plates) to light rays which, in the ordinary course of events, would exert no action upon them. The researches of Garrod in this country, and of Günther and Nencki in Germany, have placed the haemoglobin derivative haematoporphyrin in this category. Itself a fluorescent substance, it can be prepared in the laboratory, while its production in large quantities in the body gives rise to the disease variola vacciforme, classed by Garrod among the "inborn errors of metabolism." Supniewski has shown that mammalian tissues can easily be sensitized to visible light by a comparatively brief immersion in Ringer's solution containing haematoporphyrin in strengths of 1 in 20,000 to 3 in 500,000. Although neither haematoporphyrin alone (unless it be in strong solution) nor light alone has any detectable effect, yet, when exposed to light after being sensitized by haematoporphyrin, isolated portions of rabbit intestine or uterus go into strong tonic contraction and die within half an hour or so. Similar effects are observed on the isolated heart. In the whole anaesthetized animal intravenous injection of haematoporphyrin followed by exposure of the viscera to light results in violent contraction of the exposed organs, rise of blood pressure, and finally death. The injection of haematoporphyrin into normal albino rabbits, whose skins are unprotected by pigment, is also followed by fatal results. The author gives reasons for thinking that, in the case of haematoporphyrin, yellow light provides the most effective stimulus. The explanation of these phenomena is unknown. Undoubtedly they are of a general nature and fundamental importance. For their complete elucidation it may be necessary to await the application of the methods of molecular physics to the problems of biology.

ON OBSERVATION.

MR. ERNEST B. WAGGETT delivered the annual address to the post-graduate class at the Central London Throat, Nose, and Ear Hospital on November 11th. His subject was "Observation," but he began with some general encouraging remarks, one of which was that while, in every generation, there were men who carved out for themselves a great position although everything was against them, in most careers good fortune was a large element. He could name men whose careers had been made by such a chance circumstance as standing at a particular door at a particular moment. The men upon whom fortune thus smiled had, of course, great qualities, and proved themselves capable of rising to the occasion, but it was likely enough that almost any of their less fortunate fellow students would have done equally well in the same circumstances. To watch the face of fortune for its fleeting smile was not a bad piece of advice. The qualities and activities which made up a surgeon could be, and daily were, nullified by the lack of acute observation. No man could be a great surgeon without the ability to perceive correctly. At the same time he begged students not to be discouraged when an error in observation had been proved against them. Such errors occurred in the best possible circles in the region of surgery in which he and they were interested. There were special pitfalls in that branch of surgery; for example, the illumination that had to be employed, and the fact that images observed in a mirror were reversed. Incidentally he pointed out that it was an error to suppose that with monocular vision distances could not be judged. True, it was not so easy and natural to judge distances by monocular as by binocular vision, but it was perfectly feasible if only a clear image were fixed of first one and then another part of the picture. The phenomenon of parallax helped in this judgement of distance. He challenged students newly entering this branch of surgery to observe quite clearly and definitely any of the anatomical appearances of the ear, nose, and throat. He did not believe that during the first two months of such study 50 per cent. of accuracy would be achieved. The newness to the students of the objects examined would, of course, at first be a help to observation rather than a distraction, but presently familiarity would tend to produce slackness and would conflict against accuracy. Scarcely any artist could draw his wife's face without making her sit for her portrait, whereas he could draw a recognizable likeness of a railway porter whom he had seen for only a minute. Sargent's method was to stare at his subject for half an hour and then work at the canvas until that cupful of memory was exhausted, after which he had another long drinking-in of his subject. In surgical work this creation of an image in the memory was almost always essential, with the added difficulty that the inspection must be fleeting in time and all the more concentrated in intensity. Mr. Waggett urged the importance of not looking at too many cases in the hour. The out-patient room could create a world of heresy. A few cases should be concentrated upon, and the rest given a placebo with an order to return. A hasty examination was a thousand times worse than none at all. One cause of inaccurate observation might be defects of vision. Possibly glasses might be needed, and it

was worth while to make a point of that if mistakes were frequent. He urged also the employment of magnification. The small terrestrial telescope he thought to be one of the most valuable adjuvants to the bronchoscope. But, whatever the opinion about magnification, there must be clear, precise vision of every point. Besides inaccurate visual perception there were intellectual causes for wrong observation. Preconceived ideas of things were a fruitful source of error. It would be absurd to say that there must be no preconceived ideas, but in this region of surgery there was no normal typical appearance of structures, except perhaps the ossicles of the middle ear. Another extraordinarily potent source of error was anticipation of what one was to see. The lack of correct observation for any of these reasons had hindered the progress of medicine and surgery. To his own generation it seemed a thing incredible that it should have been left to Meyer of Copenhagen to discover adenoids. If a body of men whose general knowledge already gave them competence in the manipulation of patients would make a daily practice of complete detailed observation, some of them would almost certainly alight upon one of those chances which, when appreciated, led to a great stride in medical progress. Such strides had often come through chance observation. Thus did Röntgen discover *x* rays and Richet anaphylaxis. The most secure and the simplest method of becoming a great observer was to reduce the observations to drawing or writing, by which he meant something more than the case-sheet. He also urged men to work in couples, and compare notes, and wrangle over divergencies, which might lead to re-examination. In conclusion, Mr. Waggett reminded his audience that, while accurate observation was essential to success, in itself it led nowhere. Observation, unless digested by contemplation and illuminated by insight, did not bear fruit. Moreover, while there was an observation which was microscopic, there was also another kind of observation, made from the hilltops. It was in this wide outlook—though they had the power of microscopic envisagement as well—that Darwin, Pasteur, and Lister excelled, and thereby changed the whole surface of scientific thinking.

OLD MEDICAL BOOKS.

As often happens about this time of the year, there are a number of rare and curious old textbooks being offered for sale in the principal London auction rooms. The sale of the Holford library at Sotheby's early in December includes a few first-rate examples, many of them in superb old bindings, valuable in themselves apart from their contents. There is a first edition (Venice, 1528) of Paulus Aegineta's *Opera medica*, an Aldine product. From the same printer, and the same year, is a copy of Celsus's *Medicinae libri VIII*, in a very fine sixteenth century French binding. Another Aldine, in five volumes, is the works of Galen, 1525. There is also a Hippocrates of rather later date, Leyden, 1665, two volumes. More interesting than any of these is the first edition of Nicholas Leonicenus's *De Epidemia quam vulgo morbum Gallicum vocant*, the first printed work on syphilis, published at Venice by Aldus in June, 1497. In another collection, which Messrs. Hodgson are selling while this note is in the press, the following are noticeable. Michael Scott, *Physionomia et de Procreatione*, about 1510; Galen, *de Morbis Curandis*, Leyden, 1546; Philiatrus (presumably a pseudonym), *Thesaurus de Remediis secretis*, Leyden, 1555; Tagantius, *de Chirurgica Institutione*, Leyden, 1567; Argenterius, *In Artem Medicinalem Galeni*, Paris, 1578; Stempanus, *de Morbis Internis*, Leyden, 1587; Ambroise Paré, *Opera Chirurgica*, Frankfort, 1594; Mackenzie, *De Humanae Ratiocinationis Imbecillitate*, 1690—a curiously modern-sounding and provocative title; de Houppeville, *La Generation de l'Homme par le Moyen des Oeufs*, 1676—can this possibly be an anticipation of Virchow's "Omnis Cellula de Cellulâ"? There are also Belloste's *Hospital Surgeon, or a New, Gentle, and Easie Way to Cure Speedily all Sorts of Wounds*, 1701; and amongst a number of pamphlets, J. Browne, *Lecture Against the Circulation of the Blood*, 1701; Proceedings in the Management of Chelsea Hospital (appointment and dismissal of S. Lee, surgeon), 1753; Oliphant, *On the Usefulness of Vomiting in Fevers*, 1699; and many others.

SUPERANNUATION FOR LABORATORY ASSISTANTS.

We are glad to learn that the London School of Hygiene and Tropical Medicine has adopted a superannuation scheme for the technical and laboratory assistants in its employ, who are grouped in definite grades, each with its scale of salary. As the Federated Superannuation Scheme for Universities does not embrace technical and laboratory assistants, the board of the school has drawn up a scheme for their benefit on the same lines and using substantially the same machinery. The scheme does not apply to any member of the staff whose remuneration is £100 per annum or less; it is optional for those with salaries from £100 to £160; beyond that it is compulsory for all new entrants. An amount equal to 15 per cent. of the salary (5 per cent. contributed by the employee and 10 per cent. by the board) is to be applied in payment of a yearly insurance premium to secure either an annuity on retirement at the age of 60 or a lump sum under an endowment insurance policy. The memorandum embodying the scheme contains a proviso that any member transferring to another medical school or to another institution shall take the benefit of his own contributions and those made by the school. If he leaves the service altogether within five years of joining it he takes the benefit of his own contribution only, but if he leaves after five years he takes the benefit of both contributions. Provision is made also for members remaining in the service of the school after they attain the age of 60. The inauguration of this scheme, which we can well believe has been received with expressions of gratitude from those to whom it applies, should improve the status of laboratory assistants, and it is to be hoped that comparable institutions will adopt similar schemes, and thus pave the way for reciprocal arrangements in the case of transfers and promotions within the service.

NOBEL PRIZES.

The award by the Karolinska University of Stockholm of the Nobel prize in physiology and medicine for 1926 to Professor Johannes Fibiger of Copenhagen has now been officially announced. Professor Fibiger is best known to the medical profession for his work on the experimental production of cancer in rats. He succeeded in producing growths of the stomach and tongue by feeding the animals with cockroaches infested with a small nematode. The growths occurred in association with the impaction of the worms in the tissues; this was, we believe, the first instance of the experimental production of cancer otherwise than by inoculation. The same University has awarded the Nobel prize in the same subjects for 1927 to Professor Julius Wagner von Jauregg of Vienna, who introduced the systematic use of infections with benign tertian malaria in the treatment of general paralysis of the insane, a method which has now been extended to certain other chronic nervous disorders.

We have already announced that the tercentenary of the publication of Harvey's epoch-making book, *De Motu Cordis*, will be celebrated in London under the auspices of the Royal College of Physicians next spring. The date fixed for the celebration is from May 14th to May 18th. Invitations are now being issued, and it is expected that delegates from all countries will then gather in London to offer their tribute to the memory of the first and greatest of physiologists.

The David Lloyd Roberts Lecture
ON
CRIMINAL LAW AND INSANITY.

BY

LORD HEWART.

THE fifth David Lloyd Roberts Lecture was delivered on November 16th at the house of the Medical Society of London by the Right Hon. Lord Hewart, Lord Chief Justice of England, who took as his subject "Criminal law and insanity." Mr. Herbert W. Carson, President of the Society, was in the chair, and there was a very large attendance.

Lord Hewart began by remarking that the medical and legal professions seemed to have so much in common, and to be devoted in so unusual a degree to the public welfare, that any real misunderstanding between them upon a matter of public importance would be much to be deplored. Yet from time to time there were indications of a lack of complete harmony in the views with which the two professions respectively regarded, or tended to regard, the attitude of the criminal law towards insanity. The true description of the subject-matter of that difference, or apparent difference, was of no small importance. The subject-matter was not insanity, but the attitude of the criminal law towards insanity. It was natural enough that the two professions should regard insanity from somewhat different points of view. That circumstance, far from being matter for regret, was matter for satisfaction. What was to be regretted was a difference of view upon the actual and the proper attitude of the criminal law towards insanity.

The Defence of Insanity: Conditions it Must Satisfy.

The leading principle of the criminal law of England relating to insanity was still to be found in the answers given to the House of Lords by the judges in the M'Naghten case. Every man was presumed to be sane, and to possess a sufficient degree of reason to make him responsible for his acts, until the contrary was proved to the satisfaction of the jury. In other words, the burden of proof, where insanity was pleaded, was upon the defence. It was not for the prosecution to establish the sanity of the accused; that was presumed. It was for the accused to prove, if he could, that at the material time he was, within the meaning of the criminal law, insane. The word was "prove," not "suggest," nor "indicate," nor "insinuate," nor any such word. Nothing short of proof was sufficient. In order to establish a defence on the ground of insanity it must be clearly proved that at the time of committing the act the person accused was labouring under such a defect of reason, from disease of the mind, that he did not know the nature and quality of the act he was doing, or, if he did know it, that he did not know he was doing what was wrong.

The meaning of these words was sufficiently plain. The crucial time was the time of committing the act, not some other time earlier or later. The sufficient defence of insanity, related to that time, must satisfy three conditions, the first two of which were in every case obligatory, while as to the third there was a choice of alternatives. It must be proved (1) that the accused was suffering from disease of the mind, and (2) that, in consequence of that disease, he was labouring under a defect of reason. It must further be proved that that defect of reason was one of two particular kinds, and it was here that the alternatives arose. The defect of reason, due to disease of the mind, must be clearly proved to be such as either to prevent him from knowing what he was doing or from knowing that he was doing what was wrong. The defence was not required to prove both these conditions, but it must prove one of them.

Different Standpoints of Physician and Criminal Lawyer.

This requirement, that the defect of reason must be clearly proved to be such as to prevent the accused from knowing what he was doing or from knowing that he was doing what was wrong, served to illustrate the difference between the standpoint of the physician and of the criminal law. For the physician, it might be enough to find that the patient was suffering from disease of the mind and was in consequence labouring under a defect of reason. When these two facts were established it might follow, naturally, that the patient needed medical care and attention. But when the question was whether a person was to be excused from responsibility for what appeared to be a criminal act, the law insisted upon further investigation. Disease of the mind would not, of itself, afford an excuse, nor would consequential defect of reason. It must be further established that the defect of reason was of a particular kind and exhibited particular characteristics—that is, that at the material time it prevented the accused from knowing what he was about, or, alternatively, from knowing that he was doing what was wrong.

Two tests at least were satisfied by this requirement. It seemed to be manifestly in accordance with justice and good sense, as it was in accordance with the principles of the English criminal law, that a man should be excused from criminal responsibility if, through mental disease, he was at the time of his act in such a state of unreason as not to know what he was doing. This was what was meant by "not knowing the nature and quality of his act." It meant, for example, that he thought he was peeling an apple when in fact he was cutting a throat. The like observation might be made when a man was, through a like cause, in such a state of unreason that, although he knew what he was about, he did not know that he was doing what was wrong. He recalled the case of a middle-aged woman who had strangled her mother-in-law, laid the dead body on the hearthrug, and brought in the neighbours to see how well she had done her "duty." In the second place, this requirement had the effect of providing a useful test and criterion which the evidence in the case might well enable a jury to apply. In other words, what the prisoner had said or done, and the surrounding circumstances, very often yielded material which helped the judge and jury to perceive whether it was true to say that at the crucial time he did not know what he was doing, or that what he was doing was wrong.

The law did not presume to define insanity. That was a medical question. What the law considered was the conditions which had to be satisfied in order that a person might be excused from criminal responsibility, and that was a legal question. At present that question was answered in accordance with the principles laid down in the M'Naghten case. It was possible, no doubt, to find in textbooks, especially in footnotes, passages which seemed to entertain or suggest a broader, not to say a looser view, or perhaps to find here and there a similar passage in the report, whether accurate or not, of an individual summing-up. But the law remained, and it must not be forgotten that as matters now stood it was only the defendant who could appeal to the Court of Criminal Appeal; no such opportunity was open to the prosecution. Nor must it be forgotten that, while the physician tended to regard primarily the interests of his patient, the criminal law was concerned with public security. "When I am invited," said Sir Matthew Hale, "to pity the criminal, I reflect also that there is a pity due to my country." This was not to say that criminal responsibility should be imputed where it did not really exist, but it did mean that criminal responsibility should not be overlooked in those to whom it properly belonged.

Criticisms of the Criminal Law.

Lord Hewart went on to say that he did not propose to waste time in the examination of the silly, the ignorant, or the captious criticisms which had from time to time been directed against the principle of the English law. There was a kind of controversy called "eristic," which sought triumph, and a kind called "dialectic," which sought truth. No serious person had any concern with arguments which did not seek to elicit and establish what was true. Charlatanism and chicanery, for which there was a rich and attractive field, might be left alone. It would be idle to dwell upon their suggestions, and worse than idle to advertise their authors. On the other hand, it was necessary

to examine every argument or representation which did aim at the truth. The contest was brought to a point five years ago, when, after a certain notorious trial for murder, a committee was appointed, under a learned chairman, to consider any changes which might be desirable in the existing law where the plea of insanity was raised as a defence. The Council of the British Medical Association tendered evidence. The materials were fully set out in the extremely interesting and valuable report of the Committee, dated November, 1923. The British Medical Association in substance approved the Rules in the M'Naghten case, but added the qualification that no act should be regarded as a crime if at the time when it was done the person who did it was prevented by defective mental power, or by any disease affecting the mind, from controlling his own conduct, unless the absence of the power of control was the direct and immediate consequence of his own default.

The Committee so far agreed with the report of the British Medical Association as to recommend (1) that it should be recognized that a person charged criminally with an offence was not responsible for his act when the act was committed under an impulse which he was by mental disease in substance deprived of any power to resist, and (2) that in other respects the Rules in the M'Naghten case should be maintained. Was this not manifestly a fundamental alteration in what he had just described as the third requirement or condition? If accepted, it would be immaterial that the prisoner knew what he was about or that he was doing what was wrong; he would still be excused from criminal responsibility if he committed the act under an impulse which he was by mental disease in substance deprived of any power to resist.

The Plea of Uncontrollable Impulse.

This suggestion, whatever its merits, was not at all a product of the twentieth century. It was really the ancient and dangerous plea of the uncontrollable impulse, which in practice was so difficult to distinguish from the impulse that was not in fact controlled. The doctrine involved two propositions which were by no means of the same kind, nor indeed upon the same plane. The first was a proposition of fact—namely, that there were unfortunate persons in existence who, though they knew what they were about, and that they were doing wrong, were nevertheless impelled, by diseased and irresistible impulse, to commit an apparently criminal act. The second was a proposition of legislative morality or expediency—namely, that these persons, by reason of their number or otherwise, were of such importance as to require or deserve a fundamental revision of the criminal law. As to the first proposition, a mere lawyer would hesitate much before he ventured to express an opinion. The proposition belonged rather to the field of medical observation and experience. Let it be granted, for the sake of argument, that persons of this unfortunate type existed. The question remained whether, for that reason, it was just and necessary to make a drastic alteration in the criminal law. The door would be thrown widely open if the alteration were made. The objective tests for judge and jury would immediately and finally disappear. The crucial, the overriding, the dominant question would come to be whether the prisoner was acting under an irresistible impulse. Upon what materials, and with what guidance, would the jury be called upon to answer that question? Would there be any such at all except the medical opinion which the prisoner might be fortunate enough to adduce in his favour, contradicted by the medical opinion offered by the prosecution?

And what were the true dimensions of the difficulty for which so far-reaching a solution was suggested? "It was established," said the report of the Committee already referred to, "to our satisfaction that there are cases of mental disorder where the impulse to do a criminal act recurs with increasing force until it is, in fact, uncontrollable." The report here referred incidentally to mothers who were seized with the impulse to destroy children to whom they were normally devoted, but already a special statute which dealt with infanticide offered a lenient alternative in cases of mental disturbance, falling far short of insanity, where a mother not yet fully recovered from the effects of childbirth destroyed her newly born child. The Committee went on to say: "In practice, in such cases, the accused is found to be guilty but insane." That was a very remarkable statement. It suggested that what was required was already done. If the proposed change in the law were made, the verdict in such cases would be that which was briefly, popularly, and inaccurately described as "guilty, but insane." But this verdict was, it appeared, in practice already returned in such cases. What, then, remained? "We appreciate," the Committee frankly added, "the difficulty of distinguishing some of such cases from cases where there is no mental disease, such as criminal acts of violence or sexual offences where the impulse at the time is actually not merely uncontrolled, but uncontrollable." Yet the far-reaching change in the law was recommended apparently upon the ground that "the M'Naghten formula is not logically sufficient."

The Necessary Stringency of the Law.

Lawyers and statesmen would, he thought, hesitate long before they opened the door to an incalculable flood of mischief for the purely academic purpose of giving logical sufficiency to a formula. But the doctrine or theory of uncontrollable impulse was not in the least novel. It was older than M'Naghten, and might be taken to have been considered and rejected by the judges in that case. In 1859—sixteen years after M'Naghten—the matter was referred to by Baron Bramwell in R. *v.* Haynes:

> "If an influence be so powerful as to be termed irresistible so much the more reason is there why we should not withdraw any of the safeguards tending to counteract it. There are three powerful restraints existing, all tending to the assistance of the person who is suffering under such an influence—the restraint of religion, of conscience, and of law. But if the influence itself is to be held a legal excuse rendering the crime dispunishable, you at once withdraw a most powerful restraint—that forbidding and punishing its perpetration."

In 1863 Mr. Justice Wightman (R. *v.* Burton) referred to the doctrine as a most dangerous one, fatal to the interests of society and the security of life. As to the suggestion, said Lord Hewart, which was more often implied than expressed, that under the law as it now stood some prisoners were wrongly held to be fully responsible, it might be doubted whether any lawyer knew of any such case. The tendency was the other way—to accept the defence of insanity upon too slender materials. This was regarded as humane to the prisoner, though it paid too little attention to the misery of prolonged confinement in a criminal lunatic asylum. For the security of the public, on the other hand, could there be any real doubt that the comparative stringency of the existing law was necessary? After all, the mere fact that a man thought he was John the Baptist did not entitle him to shoot his mother. If a man of abnormally jealous disposition was suspicious of his wife, and his suspicions became what it was fashionable to call an "obsession," was he with impunity to kill her by poisoning, having done all that he could to conceal the crime? In cases where there was evidence of real mental disease, antecedent to the commission of the alleged crime, and there was no evidence of motive which might influence a sane person, juries had no difficulty in finding either that the prisoner did not appreciate the nature of his act or did not know it was wrong.

"But if the law were relaxed in the way which has been suggested" (said Lord Hewart in conclusion) "it might well be that, in cases where there has been no such evidence of mental disease antecedent to the alleged crime, mental experts would be found to say that the alleged crime itself afforded evidence that it was committed under an irresistible impulse, and that upon that ground the inference might be based that there was mental disease. If so, the result might be to transfer to a section of the medical profession the question whether a great number of ordinary criminals should be held responsible to the law."

BRITISH RADIOLOGY.

We announced a short time ago that the British Institute of Radiology was about to become incorporated with the Röntgen Society. The incorporation took effect on November 17th, when a general meeting was held at the Central Hall, Westminster, and an address was delivered by the President of the amalgamated body, Sir Humphry Rolleston. The following day was given up to discussions: in the morning the subjects were *x*-ray and radium protection, and *x*-ray measurements; the first subject was introduced by Mr. G. W. C. Kaye, D.Sc.; the second (*x*-ray measurements) was discussed by Professors J. A. Crowther, D.Sc., F. L. Hopwood, D.Sc., and E. A. Owen, D.Sc., by Mr. C. E. S. Phillips, and Professor S. Russ, D.Sc. In the afternoon there was a discussion on the use of opaque injections as an aid to *x*-ray diagnosis; it was taken under four heads: the nervous system (Sir James Purves-Stewart, K.C.M.G., M.D.), the urinary system (Sir John Thomson-Walker, F.R.C.S.); chest conditions (Dr. L. S. T. Burrell), and gynaecological conditions (Dr. R. A. Gibbons). In the evening a dinner was held at the Great Central Hotel, Marylebone. An exhibition of apparatus was open on both days.

PRESIDENT'S ADDRESS

BY

Sir Humphry Rolleston, Bart., K.C.B., M.D., F.R.C.P.,
Regius Professor of Physic in the University of Cambridge.

The Röntgen Society, founded in 1897 with the late Professor Silvanus P. Thompson as president, and "the oldest society which has as its fundamental principle the study of the *x* rays in their relation to medicine, the arts, and sciences," has great traditions, and played a notable part in the rise and development of radiology. In 1918 it founded the Silvanus Thompson Lectureship and Medal, the Röntgen Award in 1924, and is associated with the Electrotherapeutic Section of the Royal Society of Medicine in the administration of the Mackenzie Davidson Memorial Lectureship and Medal founded in 1920.

The British Association for the Advancement of Radiology and Physiotherapy (B.A.R.P.), founded in 1917 with the late Sir James Mackenzie Davidson as president and Drs. R. Knox and E. P. Cumberbatch as secretaries, did much good service to radiology in its comparatively short life of seven years; thus it at once took steps to establish a Diploma in Medical Radiology and Electrology, and thus was instrumental in getting the University of Cambridge to initiate this in 1920; for this new departure the B.A.R.P. worked out all the details of the course and undertook the teaching. It was therefore a most suitable nucleus for a British Institute of Radiology.

The conception of such an institute, first suggested by the late Deane Butcher in 1906, was revived in 1917, when a committee, of which the late Sir James Mackenzie Davidson was chairman and Dr. R. Knox secretary, was formed; the proposal was taken up with infectious enthusiasm by Sir Archibald Reid, who was supported by other leaders in medical radiology. The aims and scope of the Institute were broad. It was to serve as a meeting place of all interested in the subject—medical men in every department of practice, radiologists, physicists, technicians and radiographers, instrument makers and manufacturers—so that it might form a centre for consultation and co-ordination, and serve as a bureau to supply information of all kinds to provincial, overseas, and foreign colleagues, and thus to have an international influence. Although the medical applications of radiology are very important, its bearing on industry, arts, and sciences, and its relations to physics and to biology in its widest sense, cannot be too much emphasized; thus in medicine the clinicians, pathologists, anatomists, physiologists, and biochemists have much to learn from radiologists, who in their turn will reap advantage from an insight into these kindred subjects and close co-operation with colleagues.

In the spring of 1923 a committee with representatives from the Electrotherapeutic Section of the Royal Society of Medicine, the Röntgen Society, and the British Association for the Advancement of Radiology and Physiotherapy was formed under the chairmanship, first of Dr. R. Knox, and then of the late Sir Archibald Reid, with first Dr. G. W. C. Kaye and then Dr. John Muir as secretary. In April of that year the British Association for the Advancement of Radiology and Physiotherapy became the British Institute of Radiology, and obtained the Board of Trade's approval of its Articles of Association. It was therefore a most suitable foundation and nucleus for the British Institute of Radiology. Much help was given to the new project by the trustees of the Mackenzie Davidson Fund, who handed over the £1,400 collected to the organizing committee. As a result of Sir Archibald Reid's enterprise a long lease was secured of 32, Welbeck Street, and in November, 1924, a further, and as it proved somewhat optimistic, appeal for £6,000 was issued to pay off the bank loan of £2,000 and to provide a nucleus for further development.

The objectives of the Institute were set forth as follows: (*a*) To promote the advancement of radiology and physiotherapy on scientific lines under the direct control of the medical profession, protecting in every way possible the interests of those engaged in these subjects; (*b*) to secure legislative improvements in this connexion; (*c*) to provide for the delivery of lectures, the holding of classes and examinations, the establishment of scholarships, and the granting of prizes, diplomas, and certificates; (*d*) to arrange for the publication of papers, communications, or treatises; (*e*) to promote and provide for research in experimental work, and to establish grants and rewards in connexion therewith; (*f*) to establish and maintain a library and museum, and to organize exhibitions of apparatus; (*g*) to establish charitable and benevolent funds for the benefit of persons engaged in radiology and physiotherapy.

The Institute opened its doors in January, 1924, almost at the time of Sir Archibald Reid's tragic death; at any period his loss would have been a very serious blow, but at this critical juncture it might easily have been disastrous had it not been for the public spirit of the remaining guarantors, A. E. Barclay and Stanley Melville, and for the self-sacrificing efforts of Robert Knox, G. W. C. Kaye, Gilbert Scott (honorary treasurer), and others. The Institute weathered the storm, thanks to this help and to the devotion and skill of the secretary, Dr. John Muir, who combines organizing ability with the knowledge of an expert radiologist. This year has seen the amalgamation of the Röntgen Society and the affiliation of the Society of Radiographers to the British Institute of Radiology.

The incorporation of the Röntgen Society and the British Institute of Radiology is a great achievement; it took two years of negotiations to settle the financial considerations and the problems raised by the special interests of the members. It was attained after prolonged discussions between the councils of the Society and the Institute; a revised form of Memorandum and Articles of Association has been sanctioned by the Board of Trade for "The British Institute of Radiology Incorporated with the Röntgen Society, and Mr. Geoffrey Pearce, the successful treasurer of the Röntgen Society since 1915, is to continue to give his valuable services to the amalgamated Institute.

The Institute is governed by a body representing "the high contracting parties" equally; the interests of each must be respected and maintained—for example, purely medical matters must, on account of the control exerted by the General Medical Council and for reasons concerned with the educational activities of the Institute as regards the Diploma in Medical Radiology and Electrology of Cambridge, be in the hands of medical members, and on this account it is desirable that the Secretary or Director of the Institute should have a wide knowledge of medical regulations.

The Institute now has a roll of more than three hundred active members, and fortunately has the support of vigorous branches in the provinces; this is only in keeping with the extraordinary conscientiousness with which country members, often from far distant centres, have attended the meetings of the council of the Institute.

Part of the important function of forming a home and centre for all interested in radiology is the existence of a good reference library, which was started by Lady Mackenzie Davidson's gift of the professional library of Sir James Mackenzie Davidson, the recognized leader in medical radiology down to the time of his lamented death in 1919. Equally essential is a museum containing a collection of radiographic films and lantern slides illustrating completely the normal and morbid anatomy and physiology of the human body, and also, though this is rather for consummation in the future, of comparative radiology.

Just as the Institute helps individual workers and brings them into touch with each other, so will it unite for their mutual advantage and strength the various societies concerned with the subject. This alliance will enable joint action to be taken in matters vitally affecting the position of radiology as a scientific profession and the status and interests of the individual workers; thus by the formation of representative special committees on the lines of that on the protection of *x*-ray and radium workers, it would be able to express an authoritative opinion on various questions, such as the educational requirements to be demanded from those undertaking this work, and to consider delicate problems, such as the short-circuiting of radiologists when radiographers report direct to medical men, and the provision of services by voluntary hospitals to persons outside the classification properly accepted as defining hospital patients. As a centre for teaching it is of great value, as has been abundantly proved by the instruction given to candidates for the Diploma in Medical Radiology and Electrology of the University of Cambridge. Further, a most

essential object of the Institute, to which effect has yet to be given, is research work in experimental laboratories, so that team work may be undertaken, and the Institute become the centre of a worldwide organization for systematic investigation of the numerous unsolved problems which most urgently call for elucidation in the interests of mankind. For this purpose endowment to provide research fellowships and grants will be required.

The *British Journal of Radiology* since 1924 has really consisted of two journals—that of the Röntgen Society section, appearing quarterly, and that of the British Institute of Radiology section, coming out monthly—edited respectively by Drs. G. W. C. Kaye and Robert Knox, with a representative editorial board. Now that the amalgamation of the Röntgen Society with the British Institute of Radiology has been happily accomplished these two sections of the *Journal* will be merged in one journal coming out monthly, so that there will be twelve instead of sixteen numbers annually. With these two experienced and enthusiastic Editors, able to call the willing members of the editorial board to regular meetings for consultation, or for ready help at any time, there can be no doubt that the *British Journal of Radiology* will reflect the combined strength of the amalgamated bodies. It has already done much for the Institute in several ways, and special mention must be made of the self-denying ordinance whereby funds which might have been spent on improving the *Journal* have been devoted to the upkeep of the Institute.

The Society of Radiographers, which became affiliated to the Institute in January, 1927, was formed in 1920 with the assistance of the Institute of Electrical Engineers and the British Association for the Advancement of Radiology and Physiotherapy in order "to give a definite professional status to those certified non-medical assistants who work in *x*-ray and electrotherapeutic departments." It grants a certificate of membership of the Society of Radiographers (M.S.R.) to those who pass a satisfactory examination. As evidence of the interest taken in the Society of Radiographers by medical men practising radiology (radiologists) it may be mentioned that the late Sir Archibald Reid and Dr. Stanley Melville were its first two presidents, and Dr. Robert Knox a vice-president. Its Articles of Association laid down that

"no non-medical member (*i.e.*, no member who is without the qualifications entitling him to practise in Great Britain and Ireland as a physician or surgeon) shall accept patients for radiographic, radioscopic, or therapeutic work except under the direction and supervision of a qualified medical practitioner, and any breach of this regulation shall be deemed conduct unfitting the member guilty thereof to remain a member of the society."

In 1924 efforts were made to modify the restriction relating to making diagnostic reports on patients, but the General Medical Council vetoed the modification sent to them. This thorny question has several times been discussed, but the Articles of Association of the Institute of Radiology Incorporated with the Röntgen Society, to which the Society of Radiographers is now affiliated, provide that "no member or associate who is not a registered medical or dental practitioner shall accept patients for diagnosis or treatment except under the personal supervision of a registered practitioner" (Article 12). Further, as the result of the action of the General Medical Council, Section 3 of the Institute of Radiology's Memorandum of Association, which provides for granting diplomas and certificates of merit and efficiency, has been amended by the addition of the following words: "and that the holder of such diploma or certificate is not thereby entitled to undertake the medical diagnosis or treatment of patients except under the personal supervision of a registered practitioner." The medical members of the Institute of Radiology Incorporated with the Röntgen Society are bound by the regulations of the General Medical Council, and the present policy of the Institute, which is in accordance with the directions of the General Medical Council, enables radiologists to be united with radiographers for their mutual advantage. But any future change that would render it impossible for medical men to remain members of the Institute would obviously wreck the scheme of the Institute, which is remarkable for its exceptionally broad and democratic character. While there may not be any reason to anticipate such a calamity, it is perhaps well that all possible dangers should be clearly understood.

Sir Humphry Rolleston paid a warm tribute to Sir Archibald Reid. He said: While welcoming you here to celebrate the incorporation of the British Institute of Radiology with the Röntgen Society our minds must naturally dwell on the memory of Sir Archibald Reid (1871-1924), who was so keenly interested in the establishment of this Institute, and to whose personality, tact, and indefatigable energy the Institute owes its present home. To the service of radiology, the future of which he had so entirely at heart, Reid unselfishly gave the time that he should have devoted to the preservation of his impaired health. His painful disabilities were hidden by a light-hearted and kindly humorous manner which made him a delightful companion, ever alert in mind and body, and withal somewhat elusive. During the war he was president of the War Office *X*-ray Committee (1914-19) responsible for the *x*-ray arrangements for the British forces at home and abroad, and evolved out of chaos a most complete and satisfactory service for our armies on every front—a problem of enormous importance, but sore let and hindered by tiresome obstacles. He had vision, initiative, and "a way with him" of overcoming difficulties. To Archibald Reid British radiology owes much, and to remind future generations of this debt the British Institute of Radiology might well place his portrait, painted and presented by his attached friend C. E. S. Phillips, in the museum or the hall to be called after him, the like of whom we shall not see again, but the memory of whose stimulating personality will long remain an inspiration.

THE MEDICAL ASPECTS OF CONTRACEPTION.

The National Council of Public Morals established, with official recognition, an inquiry in 1913 which became known as the National Birth Rate Commission, and issued a report in 1916, and a second in 1920; in 1921 it appointed a Special Committee on the Prevention of Venereal Disease, and since then has continued to be extremely active; thus it appointed another and a strong committee under the chairmanship of Mr. Charles Gibbs, which has now issued a report on *The Medical Aspects of Contraception*.[1] This committee of fourteen authorities included several of the contributors, such as Sir Arthur Newsholme, Professor Leonard Hill, and Dr. A. E. Giles, to the work entitled *Medical Views on Birth Control*, which was reviewed in our columns on March 12th last, edited by the Rev. Sir James Marchant, the general secretary of this committee on the medical aspects of contraception. Other members of the committee are Mr. C. J. Bond, Drs. A. J. Chalmers, J. S. Fairbairn, C. Porter, H. R. Spencer, Mrs. A. Dunnett, M.B., Miss Frances Ivens, M.S., and Dr. F. H. A. Marshall, who also gave expert evidence on the vitality of the spermatozoon and the unfertilized ovum in the female generative tract. The committee held eighteen meetings, and had the advantage of evidence and statements from thirteen medical or physiologically minded men and women, including Dr. R. L. Dickinson, a former president of the American Gynecological Society and the secretary of the Committee on Maternal Health, New York, of which he is described by another witness, Dr. Gertrude Sturges, also of New York, as "a more radical member" as compared with his "extremely conservative" colleague Dr. G. W. Kosmak, the editor of the American *Journal of Gynecology and Obstetrics*. Dr. Sturges, while regarding some results of contraceptive methods as worthy of attention, did not consider that there was at present sufficient evidence to decide "as to the best methods or the desirability for a medical man to follow." Dr. Norman Haire's evidence, based on 4,000 cases seen in six years, though not printed in full, occupies more than twenty pages, or a ninth part of the volume, and goes in some detail into the technique and value of the various contraceptive methods and appliances. He recommends the use of the occlusive pessary with a jelly containing lactic acid, as the failures with this combination, properly carried out, were not more than 5 per cent. The rationale of this method is that the normal acidity of the vagina, due to lactic acid produced by Doederlein's bacillus, destroys spermatozoa; that this acidity is neutralized by alkaline mucus poured out during the orgasm; and that the alkalinity may be counteracted by supplying more lactic acid. Many douches in use destroy this bacillus, and, moreover, some, such as lysol, mercurial, and hypochloride, may set up inflammation. Lord Dawson, in brief but vigorous terms, stated the case for contraceptive methods, criticizing other lines of birth control, and giving his opinion that the use of contraceptives as such has not been proved to be physically or mentally harmful. Dr. Crichton Miller agreed with Lord Dawson, and reduced all the criticisms of contraceptives to the one heading of not wanting to give complete freedom to the community in the

[1] *Medical Aspects of Contraception*, being the Report of the Medical Committee appointed by the National Council of Public Morals in connexion with the Investigations of the National Birth Rate Commission. London: Martin Hopkinson and Co., Ltd. 1927. (Demy 8vo, pp. xvi + 182. 10s. 6d.)

matter of sex relations because of the risk of abuse. Dr. Alice Robson said that when she went to the Cambridge Birth Control Clinic she anticipated that the wrong people might come for information, but that this did not occur. Mrs. Cox, medical officer at the Walworth Birth Control Clinic, and Mrs. C. J. J. Winter of the Wolverhampton Birth Control Clinic also gave evidence. The results of many hundred experiments on rats and on 250 mice in connexion with the comparatively new vitamin E and sterility as a deficiency disease were set out by Mr. T. A. Webster, who was working in Professor Leonard Hill's laboratory; the wheat germ is the richest in this vitamin, which also occurs in animal tissues, especially muscles; it is interesting to hear that this deficiency disease affects the sexes differently; it eventually destroys the male germ cells, but does not impair the ovary or ovulation, though causing a characteristic disturbance in gestation, so that the foetus dies and is absorbed. Dr. Binnie Dunlop, honorary medical secretary of the Malthusian League, Dr. C. Killick Millard as a medical officer of health, and Dr. R. A. Gibbons as an obstetrician provided further information to the committee.

The subject of birth control and contraceptives is beset with difficulties but is most important, and the committee selected to represent various views and having much evidence from different angles must have had a hard task to draw up even the conclusions which they all signed; but in addition to their unanimous report there are three memorandums, and under them no fewer than seven out of the twelve signatures to the unanimous report are attached. The main body of the report is medical, and not concerned with ethical considerations, and its conclusions are not very startling; thus it will not surprise many to hear that the prevention of conception is being attempted by a large number of individuals, and that this number is increasing rapidly, that operative measures, such as destroying the continuity of the vasa deferentia or Fallopian tubes, are usually successful, if correctly carried out, or that abstinence, while it is the obvious, and from the ethical point of view the ideal procedure, when it is desired that no children should be born, is impracticable to the majority of young married people. The committee are definitely of opinion that strictly there is not any "safe" period, though the chances of conception are materially less from about the eighteenth day after the first day of the preceding period until the end of the cycle, that in the close relationship of married life the effects of continued abstinence may be grave for persons of certain temperaments, and that the entirely successful contraceptive, one that is sure, harmless, and simple, has not yet been discovered.

The committee would appear to realize that they have not set the seal of finality on the contentious subject of contraceptives, as in one place their report is spoken of as an interim one.

VOLUNTARY HOSPITALS IN GREAT BRITAIN.

EIGHTH ANNUAL REVIEW.

THE eighth annual report on voluntary hospitals in Great Britain (excluding London) for the year 1926 has been compiled by Mr. R. H. P. Orde, director of hospital services, Joint Council of the Order of St. John of Jerusalem and the British Red Cross Society. It has an introduction by Sir Arthur Stanley, chairman of the Joint Council, and may be obtained from the council's office, 19, Berkeley Street, W.1, price 1s. 6d. post free.

The report summarizes the financial position of 755 hospitals and the work done in the year under review. Analyses are provided of the sources of ordinary income and principal items of expenditure. Other subjects dealt with are: the function of the voluntary hospital in relation to the public health services, as described in the paper read before the British Hospitals Association last June by Sir Arthur Stanley; the relation between voluntary hospitals and institutions provided by public authorities; and the importance of the almoner's department, the address delivered by Sir Berkeley Moynihan at the meeting of the Institute of Hospital Almoners in May being incorporated in the report.

Financial Position.

During 1926 the total receipts of the hospitals under review amounted to £7,916,816; the expenditure on maintenance and development was £7,666,596, leaving a surplus of £250,220. The number of hospitals with a credit balance on their maintenance accounts was 67.28 per cent. of the total. The income fell as compared with the previous year by £222,404, while the expenditure rose by £546,506. Mr. Orde has calculated that this relative deficiency of £768,910 denotes that each hospital bed was poorer by £16 8s. 4d., or rather less than 1s. a day. He draws the conclusion that, although the total burden of the hospitals' deficit may appear heavy, it could be quite easily borne if well distributed. In order to obtain a more accurate survey of the financial position of the provincial voluntary hospitals, new tables have been introduced into the report this year with a view to showing whether the income was sufficient to meet the maintenance expenditure during that period. In previous reports it has never been possible to state definitely the number of hospitals which would be found to be paying their way if the extraordinary income and expenditure were taken into account. The new method of analysis elucidates this matter, and the results are illustrated by coloured diagrams. With regard to the extraordinary receipts, the suggestion is made that legacies follow in the train of organized appeals more often than is generally thought—a fact which appears to be better understood north of the Tweed than further south. While 437 hospitals with credit balances received practically one-seventh of their income from free legacies, 219 with adverse balances received only one-seventeenth in this way.

General Statistics.

The number of available beds in these hospitals was 46,815, and the total number of new in-patients during the year was 693,196. The total number of new out-patients was 2,757,415; these are definite advances over the figures for the previous year. It is estimated that the yearly increase in the volume of work which the voluntary hospitals have to undertake is approximately 40,000 in-patients and 150,000 out-patients. Mr. Orde suggests that it is possible, so far as the voluntary hospitals are concerned, that the shortage of beds is not so serious as the Voluntary Hospitals Commission reported two years ago, but in the last few years the burden of traffic accidents has become increasingly heavy. It is thought that much of the in-patient work which these hospitals are consequently almost compelled to undertake could be equally well performed in less expensive institutions. At one hospital during the year an entire surgical ward of twenty-five beds was continuously occupied by patients suffering from the results of motor accidents, whereas five years previously these beds were available for the treatment of ordinary surgical cases from the locality. Moreover, the rate of progress in providing accommodation is retarded at present by the uncertainty as to the future relation between the voluntary hospitals and those provided by the public authorities. The volume of work in the Scottish hospitals appears to have grown during 1926 approximately at the rate of 6 per cent. in the case of in-patients and 9 per cent. in the case of out-patients, whereas the corresponding figures for the English and Welsh hospitals are 8 per cent. and 6 per cent. respectively.

The General Outlook.

With a view to obtaining information about the future relation between the voluntary hospitals and those provided by public authorities, questions were sent out early in 1927 to administrative officers of several large provincial voluntary hospitals. The inquiry related to the possibility and advisability of defining the spheres of activity of these institutions; the ability of voluntary hospitals to provide the funds to meet their needs within defined spheres; the alleged danger of the voluntary hospital losing its support owing to the existence of similar buildings provided by public authorities; and the devising of a scheme of co-operation which would preserve the character of the voluntary hospitals. Replies were received from responsible authorities in hospitals at Sheffield, Newcastle-on-Tyne, Dundee, Manchester, Oxford, Sunderland, Wolverhampton, Norwich, Chester, and Northampton; these are published, but no attempt is made to collate the results.

MEDICAL SICKNESS, ANNUITY, AND LIFE ASSURANCE SOCIETY.

The annual general meeting of the Medical Sickness, Annuity, and Life Assurance Society, Ltd., was held at the offices of the Company, 300, High Holborn, W.C., on November 14th, under the chairmanship of Dr. F. J. Allan.

Chairman's Address.

The Chairman said that the feature of last year's business was that although the amounts insured were greater the actual new premiums were smaller; this was accounted for by the large number of younger men who had joined the society soon after qualification, and were therefore entitled to receive a rebate on the first two years' premiums. While the expenses of the society had fallen, the gross rate of interest had increased. In common with all business concerns the society naturally felt the effects of the strikes of 1926, but on their cessation it recovered ground, with the result that it was one of the few insurance companies able to show an improved position. In a number of cases where members had had difficulties in meeting liabilities previously undertaken, the society had been able to make arrangements to assist them over the trying period. The claims for sickness benefit were above the average, and the influenza epidemic in the spring caused an increased expenditure of nearly £3,000. From statistics prepared by the secretary of the society it appeared that during the four years ending June 30th, 1926, 306 members had undergone operations, major and minor, and the number of weeks' sickness experienced in those cases was 2,137, the average duration being six weeks six days. It was found that, generally speaking, the greatest number of operations was between the ages of 30 and 50 years. Many grateful letters were received from members receiving benefit as the result of sickness or accident. Dr. Allan found that 24 per cent. of the members drew benefit each year; fifty were permanently disabled and had been incapacitated for a long period; in one case a member had drawn benefit for twenty-four years. The importance and value of a permanent contract as compared with an annual one, which might be terminated at any time if a member began to make claims, needed no emphasis. Every endeavour was made to treat members fairly and justly, and the society paid what the member had insured for until he was able to resume work. The life assurance fund showed a steady increase. The excellent value given in the society's combined life and sickness tables had won the admiration of insurance companies. The total new sums insured had increased from £136,810 to £146,025. The rates offered by the society were low as compared with other companies, because they had not hitherto added a loading for the purpose of bonus or payment of commission to agents. To meet the wishes of some members, who were prepared to pay a small additional sum by way of an annual premium in the expectation of receiving a rate of bonus equivalent to that paid by other companies, the society had prepared a list of tables at a slightly higher extra premium, which would provide for a guaranteed bonus in addition to any other bonus which might be declared on the existing rates. The society had introduced a scheme for the assistance of practitioners purchasing houses, and also one to help young members of the profession to enter into practice.

The adoption of the report and audited accounts, having been put to the meeting, was carried.

Election of Directors and Auditors.

Dr. C. Buttar and Dr. W. K. Sibley were re-elected to the board of directors, and Messrs. Harber, Sturgess, and Fraser were reappointed auditors. On the motion of the Chairman a vote of thanks was accorded to the manager and his staff for their excellent work during the past year.

Quinquennial Valuation.

The Chairman, in presenting the quinquennial valuation report, recalled that several members expressed doubts as to the wisdom of changing the society from a friendly society to a mutual company, but he considered that the present report amply justified the course adopted. The greater freedom given under the Life Assurance Companies Acts had contributed in no small extent to the success shown by the valuation. The Life Assurance Fund was being built up slowly but surely. The mortality experienced was only 55 per cent. of the actual expected deaths, and the net interest was £4 10s. against 3 per cent. assumed in the valuation, which, coupled with the low expenditure, was a source of profit. The surplus thus produced amounted to £21,850, and the cost of the bonus recommended was estimated at £12,117. It was the intention of the society to build up and conserve its resources in every possible way. The rates charged by the society for the "with profit" policies were about 9s. per cent. lower than the average of other companies. The Annuity Fund had been valued on the latest tables, which showed a longevity beyond that experienced on all previous tables. It had, therefore, been decided to strengthen it by a transfer of £3,000 from the reserve fund. A stringent valuation had been made of the Sickness Fund. The actuary had estimated that £245,071 was required to meet the liabilities of the fund, and as the fund amounted to £333,712 there was a surplus of £88,641. Acting on the actuary's advice, it was proposed to distribute £49,640 in the form of reversionary bonuses. As showing the progress of the society since the last valuation in 1922 the chairman enumerated the increases in the various funds, and said that the total funds had increased from £350,000 to £511,000. During the five years £125,000 had been paid to members in respect of sickness and accident, as compared with £98,000 in the preceding five years.

The recommendations suggested by the directors were then put to the meeting and adopted, and, on the motion of Sir William Willcox, seconded by Dr. Harvey Hilliard, a hearty vote of thanks was accorded to the chairman for his work on behalf of the society during the past year.

England and Wales.

Lord Mayor of Liverpool.

The election of Miss Margaret Beavan as Lord Mayor of Liverpool is an event of medical interest because the proofs of her administrative capacity are to be found in works and enterprises closely related to practical medicine. As founder of the Child Welfare Association in Liverpool, she commenced work in a small way, but with fervid enthusiasm, dogged determination, and splendid pertinacity she has developed an association of unsurpassed activity and efficiency. As collateral enterprises, the institution of two hospitals and one convalescent home was almost entirely due to her personal initiative, while the scholars of the special day schools, "tired mothers," and many other groups of poor mothers and children in Liverpool owe much to her. In the development and direction of child welfare work she has done nobly by her native city. She has also been fortunate in a sympathetic and generous environment, and in a contemporary medical atmosphere exceptionally progressive. Nearly thirty years ago Sir Robert Jones and Dr. C. J. Macalister gave practical expression to their desire for therapeutic prophylaxis by obtaining the erection of a country hospital with school for long-continued cases; such complete treatment for medical and surgical cases of illness in childhood was among the pioneer movements in the country. With the after-care work involved Miss Beavan's Child Welfare Association was in close touch, as it has always also been with all the activities of the official services in Liverpool dealing with children. The approach to a right appreciation of medicine through welfare work is not easy, but thirty years is a long probation. Miss Beavan has proved herself a master in welfare work, and in the less emotional field of medicine it is hoped the coming year will find in her a true friend and a wise coadjutor.

Cost of Tuberculosis Treatment.

A memorandum (122 A/T) has been issued by the Ministry of Health containing, in tabular form under various headings, the weekly cost for each patient at certain residential institutions for the treatment of tuberculosis in England and Wales during the year ending March 31st, 1927. For the purposes of comparison the corresponding figures for the previous two years have been inserted when available. It is hoped that this information may assist authorities in deciding whether in a given case the various items of expenditure are on the lowest possible level compatible with efficiency, and so may enable them to administer their institutions economically. Since it is clear that full value for the expenditure incurred at any residential institution can only be obtained if the beds are constantly occupied, it is recommended that all possible steps should be taken to secure that vacant beds are filled without delay by suitable patients; in this respect the co-operation of authorities of other areas is advised. As in previous years the question of the proportion of staff to beds for patients is emphasized, and there are indications that in some institutions this matter still requires careful consideration.

All-day Venereal Clinic.

The London County Council is being asked by its Public Health Committee to make a grant in aid to the West London Hospital to permit of the establishment there of an all-day clinic for venereal diseases. Such a clinic cannot be satisfactorily provided in the existing hospital building, and the governing body of the hospital is prepared to erect a new building for the purpose at a total cost, including equipment, of £13,500. The grant proposed to be made by the London County Council will be £1,500 a year for the period (about thirteen years) necessary for the repayment with interest of a loan of this amount. The arrangements for the clinic will be subject to the annual approval of the Council and of the Minister of Health, and it will be a condition that the building shall be used under the scheme for the diagnosis and treatment of venereal diseases or other approved public health services for at least thirty years. All-day clinics have up to now been established at five hospitals in London, but the need for such a clinic to serve the western districts, for which the West London Hospital is conveniently situated, has been felt for some time.

Scotland.

Royal Scottish National Institution Colony.

An appeal has been issued by Mr. John Buchan, M.P., in aid of the fund for the establishment of a colony in Scotland for the maintenance and training of mentally defective children. The proposed colony is to be established in connexion with the Royal Scottish National Institution at Larbert, Stirlingshire. The author of the appeal points out that in the old Scots life the village idiot was a familiar figure, that the world of our ancestors, where men and women crowded to witness public executions or went in throngs of a Sunday to stare at the lunatics chained up in Bedlam, was an inhumane world, but was also a small world where life was slow and simple. In the Scottish rural parishes of former times an idiot had kindly treatment and led a not unhappy life. To-day, however, there was no room for this casual charity, and the mentally defective, if uncared for, were apt to sink to the lowest depths of suffering and degradation. There was now a statutory provision for the care of mentally defective children, but the provision ended at the age of 21, when the defective man or woman was cast upon the world. No one who remembered the tenderness with which Dickens had drawn characters like Jo and Maggie, Smike, and Barnaby Rudge could contemplate without terror the future of any defective child in whom he might be interested, and the world to-day was more intricate and difficult than the world of Dickens. A Royal Commission had reported upon the problem, and the Mental Deficiency and Lunacy (Scotland) Act was passed in 1913. Under that act a responsibility to provide for feeble-minded children was laid on district boards of control. Long before this time the Royal Scottish National Institution at Larbert had been founded in 1862. To-day it housed five hundred juvenile defectives, to whose well-being infinite care and thought were given. This institution dealt with three classes—private pupils whose relatives could afford to pay for their maintenance, pupils who were maintained largely at the expense of public authorities, and thirdly, children who did not come under the definition of the Act, but who were the offspring of recipients of small fixed salaries who could do little to support them. The latter class of children composed about one-tenth of the inmates, and there was a tragically long waiting list for their admission. This large class, which lay between those in a position to pay and those for whom public authorities were responsible, could only be supported out of charitable contributions. In England there were several whole-life institutions for these persons, in Denmark there were farm colonies for the purpose, and in some of the American States admirable provision had been made for such cases, but in Scotland nothing had yet been done. The Royal National Institution, therefore, proposed to establish a colony on a neighbouring estate which it had acquired, where three hundred patients could be accommodated and trained for useful work. This would be the first colony in Scotland for the whole-time care of the mentally defective, and no less than £70,000 would be required.

Animal Diseases Research.

The Institute of the Animal Diseases Research Association at Moredun, Gilmerton, near Edinburgh, was opened on November 4th by Sir John Gilmour, Secretary of State for Scotland. The Duke of Buccleuch, who presided, said the erection of the institute was one of the best things that had ever been done in the interests of agriculture in Scotland, and Sir Robert Greig, Chairman of the Board of Agriculture for Scotland, described the institute as the spear-head of the attack on animal diseases in Scotland. Sir John Gilmour, in declaring the institute open, said that this enterprise was initiated by the great stock-breeding interests in the country, and that it had arisen by recognition of the necessity for dealing with problems upon which the existence of flocks and herds depended. Scientists, professors, and researchers had their place, but there was still a difficulty in persuading the practical farmer and stockbreeder that the scientist was doing something for his real advantage. They must realize the enormous loss that fell upon the country every year from disease. It was known that diseased cattle might carry the seeds of trouble in milk to human beings, and therefore the idea was growing that research in animal diseases was closely linked up with the progress and well-being of the community.

Veterinary Training in the West of Scotland.

Professor John Glaister, M.D., who presided at the annual prize distribution at Glasgow Veterinary College on November 9th, said that 72 students had presented themselves in the past year for examination, of whom 45 had passed (62 per cent.). Four women students had attended the classes in the past year, and it was expected that an increase of women students would take place during the coming session. Eight of the students were studying for the B.Sc. in Veterinary Science of the London University. Last year one of the students of the college, Mr. Thomas Johnston, had won the Fitzwygram prize given by the Royal College of Veterinary Surgeons to the student who obtained the highest aggregate marks in the examinations for its membership. Some difficulty had been caused by the withdrawal of the Government grant to the college on the grounds that there was no room for two veterinary colleges in Scotland. The Glasgow college had, however, not come to an end, and was to be continued. Lord Provost Mason thereafter presented the prizes.

Dr. J. S. Muir of Selkirk.

Dr. John Stewart Muir, J.P., who is now 83 years of age and began his professional career in Selkirk as long ago as 1867, recently celebrated the fiftieth anniversary of his appointment as medical officer to the Selkirk Parish Council. The occasion was taken to entertain him at a supper in the County Hotel, and to present to him a framed and enlarged photograph of the members of the council with himself in the centre of the group. The chair was taken by Mr. Robert Stark, chairman of the parish council, and Dr. Muir, in returning thanks, recalled some of his adventures while attending patients on wild stormy nights in the lonely places of Selkirkshire. Provost Ballantyne described Dr. Muir as the best loved man in the town and county, and other tributes were paid to his great professional services and his good work in the public life of Selkirk and district. Dr. Muir was chairman of the South-Eastern Counties Division of the British Medical Association in 1912, and is a past-president of the Edinburgh Branch. He was formerly surgeon lieutenant-colonel in the Border Rifles, retiring with the rank of honorary colonel, and holds the Volunteer Decoration.

Central Midwives Board Examination.

At the examination just concluded of the Central Midwives Board for Scotland, held simultaneously in Edinburgh, Glasgow, Dundee, and Aberdeen, out of 147 candidates 129 passed. Of the successful candidates 17 were trained at the Royal Maternity Hospital, Edinburgh, 48 at the Royal Maternity Hospital, Glasgow, 9 at the Queen Victoria Jubilee Institute, Edinburgh, 7 at the Elsie Inglis Memorial Hospital, 9 at the Royal Infirmary, Dundee, 9 at the Maternity Hospital, Govan, 2 at the Maternity Hospital, Aberdeen, 4 at the Stobhill General Hospital, 3 at the Barshaw Maternity Hospital, and 2 at the County Hospital, Bellshill, and the remainder at various recognized institutions.

Ireland.

Poor Law Milk Supplies.

The Minister for Local Government and Public Health of the Irish Free State has notified that from time to time he has observed that local Poor Law authorities experience considerable difficulties in regard to the quality of the milk delivered under contract to the institutions within their charge, and that legal proceedings under the Sale of Food and Drugs Acts on account of deficiencies of fats or other solids are not always attended with satisfactory results owing to the plea that the milk delivered was in the same condition as when it came from the cow. While this defence may exonerate a contractor from culpable manipulation, it leaves the inmates of public institutions, often invalids and young children, open to receive a milk supply of inferior nutritive value. The question of milk standards was examined by an interdepartmental committee, which recommended that as a means of educating public opinion with regard to differential milk values, local authorities, in placing their milk contracts for supplies to institutions or establishments under their control, should be advised to specify a minimum content of fats and other solids. The Minister concurs in this suggestion, and commends it to the favourable consideration of Poor Law authorities. The minimum specified in the contract should not be below the legal standards of 3 per cent. for fats and 8.5 per cent. for other solids, but it would be open to the local authority to stipulate for a higher requirement, having regard to the circumstances of the district and to the season of the year. The contract should include provision for a suitable penalty in case of non-compliance. Before accepting a tender the Poor Law authority, if also a public health authority, should arrange for a report on the condition of the premises and on the health of the cattle from their dairy inspection staff. If not a sanitary authority, they should apply to the sanitary authority concerned for similar information. An adverse report would be a sufficient ground for the non-acceptance of the lowest tender.

Correspondence.

THE LATE PROFESSOR ADRIAN STOKES.

Sir,—I had not yet returned from South Africa when the obituary notice of the late Professor Adrian Stokes appeared in your issue of October 1st, and this and the subsequent correspondence escaped my notice until I re-read my *British Medical Journals* after my return to this country. As I happen to possess accurate records bearing on the subject of Professor Stokes's services at the front in 1914 and 1915, and as my information in this respect is in a sense unique, I venture to submit a few facts, which can be verified from a diary kept by me at the time.

At the end of September, 1914, I was acting as D.A.D.M.S. at General Headquarters under the D.D.M.S., Colonel O'Donnell (now Lieutenant-General Sir Thomas O'Donnell, K.C.S.I., D.S.O., etc.). Visiting the hospitals at Braisne in this capacity, I was shown several patients who seemed to be undoubted cases of enteric, and I returned to Fere-en-Tardenois and reported the matter to my chief, who at once telegraphed to the D.M.S., then on the lines of communication, asking that a bacteriologist should be sent to verify the diagnosis. Next day Adrian Stokes arrived on his own motor cycle—which he had had the wisdom to bring with him on proceeding to France—and reported for duty. He had been sent off from the lines of communication without any bacteriological equipment whatever, and with no very definite instructions as to what his duties were to be. This was disappointing, but not unnatural, seeing that the rapid change of base consequent on our retreat had considerably disorganized medical services in back areas. With Colonel O'Donnell's permission I at once called on the Adjutant-General, Sir Nevil Macready, and obtained, through his kindness, the sum of £60 to purchase technical equipment. This I handed to Adrian Stokes, and together we drew up a list of requirements, and, with a letter of introduction to the Pasteur Institute, he started straight away on his journey to Paris. There he purchased a microscope and a certain amount of glassware, and obtained, through the kindness of the Pasteur Institute, an ample supply of media, ready made and sterile. Packing all these items on his motor cycle he started, without any rest, to return to the front, and within a day was back at Braisne working at the suspected enterics.

By October 3rd, within a few hours of getting to work, he was able to report that four of the suspected cases, in non-inoculated men, had given positive Widal reactions. On October 8th he sent me a further report recording fourteen positive Widal reactions and three positive blood cultures. This will suffice to show that he had got down to work at once and was already providing us with absolutely definite information. He continued this work at Braisne during the remainder of the Aisne battle, and threw a flood of light on the gradual development of enteric in the non-inoculated reservists called up hurriedly to the colours on mobilization.

The true story of the organization of mobile bacteriological laboratories will be found in the article on the "Organization of Pathological Services" by the late Sir William Leishman, in the *Official History of the War* (Medical Services, Pathology), page 9, 1923. The first bacteriological laboratory to reach France arrived at St. Omer on October 14th with Lieutenant Rowlands in charge. So great was the success of this laboratory that the director of hygiene determined to have mobile laboratories on somewhat similar lines fitted up for the hygiene department. The first of these latter arrived at St. Omer on November 25th, 1914, under Lieutenant Myers Coplans, who afterwards did excellent work in the Second Army area. General Porter is mistaken in supposing that the Myers Coplans mobile laboratory was the first to be constructed, or that it was contemplated in August, 1914. The first laboratory was that constructed by the Lister Institute and which came out under Lieutenant Rowlands.

General Porter may be right in saying that Adrian Stokes took no part in the operations conducted by the medical services *in the Second Army area*, for dealing with the typhoid epidemic of 1915. The greater part of this work was done by the Friends' Ambulance Unit, acting under the able direction of General Porter and the D.A.D.M.S. (Sanitation), Second Army, and it is to be hoped that their splendid services and those of two Belgian ladies, who organized a hospital close to Poperinghe, will one day be fully recorded.

It is, perhaps, not unnatural that General Porter should speak of the Second Army area only, but it is well to bear in mind that the Belgian civilians removed from their homes and from General Porter's area had to be dealt with somewhere else. As a matter of fact, they were dealt with, in the first instance, under arrangements made by G.H.Q. at the Convent of Malassise, close to St. Omer, where a general hospital was opened for the purpose, under the command of Lieut.-Colonel (now Major-General) Guise-Moores. At this hospital the bacteriological work was carried out by Adrian Stokes and Cecil Clarke, and their efforts for these Belgian patients from the Second Army area were unremitting.

In this connexion I venture to send you a letter received

by me from Adrian Stokes in May or June, 1915, in which he gives particulars of no fewer than 1,000 typhoid patients investigated by him. The figures in the letter fully justify publication from the scientific point of view, and I hope that you will find space for it as a vindication of the work of Adrian Stokes in connexion with military and civilian enterics from the Second Army area during the typhoid outbreak referred to by General Porter.

May I add to the remarks of "A. F. H." a brief word in appreciation of the late Professor Adrian Stokes? Both during the early days of the war and later when, as adviser in pathology, I came into still closer contact with him, he appealed to me as one of the most reliable, original, energetic, and lovable of the officers engaged in bacteriological research at the front. Adrian Stokes's original letter is appended; though undated, I can place it in point of time from my diary. It was written by him in the stress of field work, and is all the more interesting on this account.—I am, etc.,

S. LYLE CUMMINS.

Cardiff, Nov. 11th.

Professor Adrian Stokes's Letter.

Dear Colonel Cummins,

I have now some numbers that I think will interest you. Of 400 civilians whom I have examined, 12 have been found to be carrying; 5 are Eberth, 5 are "B," and 2 are "A"; they are all faecal and all, with two exceptions, over 45 years; one of the exceptions was a child of 5, and she, I think, was only temporary, the other was a woman of 30. Of about 600 troops examined (both faeces and urine) I have got 4 carriers, 2 "B," and 2 Eberth; one of the "B's" was either precocious or paradoxical, they were all faecal. Of about 300 more whose urine only was examined, there were no positives. The whole lot of 1,000 were done two ways by direct plating and also in one dilution of brilliant green, the dilution which gave the best experimental results; 12 were positive both ways, an Eberth and a "B" were found by direct plating when the B.G. plate was negative and conversely an Eberth and a "B" were found by B.G. plate when the direct plate was negative. I think that this indicates that it would be better to continue to do both methods, but it does not take account of the fact that the B.G. plate is far easier to deal with and generally shows very many more colonies than the direct plate. They were always plated on Endo's medium. I have often had an absolutely pure growth from the B.G.

Now about the blood cultures; of 650 done up to date I have had 38 positive. Going through the lists from the base and from your office I have found 11 whom I have bled and found negative who were subsequently diagnosed at the base; now the cultures are looked at two days running—the first day, after in or about eighteen hours' incubation, and the second after about forty-two, so that if they were positive there is not a very great chance of my missing them, and yet there is only about 75 per cent. of positive results of possibles. This is not so good as I had thought it should be, and I don't understand it. The cases have not all been traced, but three of them were bled within four days of onset, and that should have been good enough. Can you suggest the solution? I apologize for this interminable screed.

Yours sincerely,

A. STOKES.

MEDICAL CONFIDENCES.

SIR,—Your leader upon the effects of the McCardie judgement in July last (July 30th, p. 178) gave weighty expression to the feelings of consternation amongst medical men at the prospect of being compelled to betray the solemn trust of their patients at the order of a judge. Since resumption of Parliament I have had the opportunity of conversation with some leading counsel in the House of Commons, and I have received from them very considerable encouragement for the suggestion that I should ask, under the ten minutes' rule, leave to introduce a bill securing, as the *minimum* concession, privilege from disclosure for communications made by patients to medical practitioners in pursuance of Article II (2) of the Public Health (Venereal Diseases) Regulations, 1916. I have obtained leave for a motion, which is now upon the Order Paper, for Tuesday, November 22nd, to introduce a bill, as follows:

"Medical Practitioners' Communications Privilege.—Bill to provide that certain communications between medical practitioners and their patients shall be privileged from disclosure in evidence,"

and I am promised the support of a number of very distinguished lawyers in the House for a bill securing privilege restricted to the special case of venereal diseases. I should, of course, have preferred unrestricted privilege, and a clause which I had proposed to incorporate in my bill ran as follows: "Confidential communications passing between a medical practitioner and his patient shall be privileged from disclosure where made for the purpose of obtaining or giving medical assistance in some illness from which the patient is suffering." I am, however, being earnestly dissuaded from attempting this wider purpose by distinguished lawyers in the House, who warn me quite frankly that there would probably be general opposition from lawyers to the enlargement of medical privilege to the same degree as the lawyers now enjoy. If your readers can in any way assist, by representations to their Members of Parliament, the acceptance of my motion on Tuesday, November 22nd, the crying scandal of the present position—namely, the conflict between law and regulations in relation to the administration of the venereal diseases clinics might perhaps be removed.—I am, etc.,

E. GRAHAM LITTLE.

House of Commons, Nov. 14th.

WATER SUPPLY, IODINE, AND FOOD IN RELATION TO GOITRE.

SIR,—I was interested to see the letter in your issue of November 12th (p. 897) from Dr. Philip Turton, who, along with Dr. Ash, county medical officer of Derbyshire, has done an enormous amount of work in relation to goitre. His remarks regarding relation of vitamins to goitre are particularly interesting to me, as we have, among our measures to prevent goitre, been recommending a diet similar to that advised by McCarrison and noted by Dr. Turton. The following is an extract from my school medical report for 1924:

General Preventive Measures.

"In addition to treatment in the schools the M.O.H. is at present, and has been for some time, carrying out in maternity and child welfare and school medical work certain general measures which he believes will tend to prevent goitre: The recommending of (*a*) a special diet containing vitamins and cod-liver oil (which contains iodine in minute quantities); (*b*) cleanliness of habits; (*c*) fresh air and sunshine, and (*d*) removal of focal infections, etc.; leaflets for expectant mothers, infants, toddlers, and school children containing these recommendations are distributed."

A leaflet issued to the parents of children attending school contains the following:

"During the period of growth good fresh food with a large proportion of fats and vitamins is necessary. Recently acquired knowledge shows that for proper growth children require food rich in vitamins. These are specially necessary for pale, flabby, and rickety children. The following are foods containing these vitamins or essentials for growth and health: Brown bread, eggs, oils (especially cod-liver oil), milk, butter, liver, beef suet and dripping, wholemeal, fresh vegetables, especially green vegetables, such as cabbage, watercress, salads, potatoes, apples, oranges. Salads containing lettuces, etc., and fruit are very good after meals as they help to cleanse the mouth and preserve the teeth. Of all foods, milk is the most necessary for a growing child."

We certainly have some decrease in the incidence of goitre in Glossop, but in addition to the advice given above we search for goitre in the early stages and administer iodine in suitable cases. Iodine, however, does not suit every case, and in one part of our town with a lead-soluble water supply the administration of iodine appears to have no effect whatever. The causation of goitre is evidently complicated by a variety of factors. Perhaps a deficient diet associated with lack of sunshine may be among such factors, and I think it is wise, therefore, that we should not rely upon one panacea alone for the prevention and treatment of goitre.—I am, etc.,

E. H. M. MILLIGAN, M.D., D.P.H.,
M.O.H., Glossop.

November 12th.

RADIATION TREATMENT OF BREAST CANCER.

SIR,—The average medical man, after carefully reading the account in your issue of October 22nd of the discussion at Edinburgh on the radiation treatment of cancer of the breast, must, it seems to me, be left in a confused state of mind. On the one hand he reads that the use of massive doses of highly penetrating rays was advocated not only in the inoperable case, but also for post-operative treatment in all cases, including those in which there is at least a fair chance that the patient may do well even if left alone.

It was stated by the opener of the discussion that it was necessary to cause some erythema, and the possibility of subsequent ulceration was admitted. Reference was made also to the occurrence of an "*x*-ray pneumonia," and a case quoted in which a typical bronchiectasis remained. On the other hand, the inquirer will see that, so far as can be judged from a report of the subsequent discussion, no support was forthcoming for these views.

The general views of British radiologists were, I think, well expressed by Dr. Barclay, and may be summed up in the maxim, *nil nocere*. This applies especially as regards prophylactic post-operative irradiation. The surgeon, if he has operated on what he believes to be a favourable case—a case which may reasonably be expected to remain free at least for some years—cannot be expected to recommend to his patient any method of after-treatment which involves risks.

Purely prophylactic treatment should take the form of short courses of *x* rays of medium penetration, given in divided doses spread over a few weeks. Such treatment should produce no visible effect on the skin other than a slight browning, and, in a patient below par, should have a good effect on the general health. The value of such courses must be judged partly from observation and partly by inference. That many patients remain free for long periods under such treatment is undoubted, but the chief argument in favour of such a dosage system is to be found in the fact that similar treatment may cause the total disappearance of carcinomatous breast tumours in some instances, and, in others, render inoperable cases operable. How these results are brought about is not clear. There is certainly no question of a "lethal dose" to cancer cells, although there may be some selective depressant action. Far more important is the stimulation of natural defence mechanisms, both local and general. These courses of *x* rays should be alternated with treatment by ultra-violet light. All *x*-ray therapy departments in large hospitals are overburdened with inoperable or recurrent breast cases. My experience is that while some of these patients seem to "live on" *x* rays for years, others, after a temporary improvement, relapse. The condition of such patients is terrible indeed. They are in pain, they are gradually losing weight, and their physical condition, combined with the fact that their last hope, *x* rays, has failed them, causes them to fall to the lowest depths of depression. About a year ago, at the Croydon General Hospital, I decided to try the effects of general light treatment on such cases. The results have in many instances been remarkable. The following are brief notes of two cases:

A spinster, aged 42, underwent radical removal of the left breast in January, 1925. Recurrence occurred above the left clavicle, and she was operated on again on March 18th, 1927. Several glands were dissected out and the wound closed. She had a course of twelve *x*-ray sittings during March and April. She was losing weight and suffered from pain and depression. General light treatment was commenced on May 12th, and continued, with one month's intermission, till October 17th. The pain was relieved, the spirits raised, and the weight increased by 7½ lb. The patient says—and similar expressions are common—"the sun treatment is life to me."

A spinster, aged 67, four years ago noticed a lump in the left breast, which has since increased in size. There was no pain, but the lump had "itched" lately. When examined in April, 1927, the lump was fixed to the ribs, and there were glands in both axillae, also a gland in the right groin, which was removed by Mr. Cowell. The pathologist reported much fibrous tissue, with a few small areas of carcinomatous cells. The patient had a course of eighteen *x*-ray treatments. She was very miserable and was losing weight. She was given light treatment before completion of the *x*-ray course. The light treatment was continued till August 6th. The patient was now cheerful, and had gained 6¾ lb. in weight.

There have been similar successes, and also some failures. On the whole, the results have surprised me. The more I see of breast cancer the more I am impressed by the part which general resistance plays in holding it in check. Apparently light can raise this resistance when *x* rays have ceased to do so. On the other hand, *x* rays may again have a beneficial effect after a long course of light.

At the French Hospital, and at the Croydon General Hospital, cases are sent for prophylactic *x*-ray treatment within a few days after operation. I would urge surgeons, if they are going to send cases at all, to send them soon; and to those surgeons who continue to distrust *x* rays I say, at least send your patients for repeated courses by general light treatment, to which, if properly conducted, there can be no possible objection on the ground of risk.

In conclusion, I want to make it quite clear that I am a believer in deep or high-voltage therapy in its proper place. In pelvic cancer, in mediastinal invasion, in painful metastases of bone, and many other conditions, it is invaluable when carefully used. I have used it myself for over five years, and have felt the need of it so much in hospital practice that I have recently induced the Croydon General Hospital to equip a special department for this form of treatment. In the post-operative prophylactic radiation of breast cancer intensive therapy is, however, entirely out of place.—I am, etc.,

London, W., Oct. 22nd. F. HERNAMAN-JOHNSON.

THE THERAPEUTIC ACTION OF CALCIUM SALTS.

SIR,—In the JOURNAL of October 29th (p. 777) there is an account of the therapeutic action of calcium, from which one gathers that those who had studied the subject have very little opinion of its merits as a therapeutic agent. From my own experience and that of others there would seem to be something very far wrong with the methods used. I believe that such substances as calcium lactate may be very useful in such diseases as tuberculosis. I do not, however, wish to enter into this, but to refer to the action of calcium in the colloid state; the particular substance I have used is Crookes's collosol calcium, which I have given extensively hypodermically and also by the oral route. The amount of calcium used is often very minute, as the strength is 1 in 2,000, and a dose of as little as 0.1 c.cm. may be sufficient to produce effects. It would seem, therefore, that quantitatively it cannot have much effect.

The extraordinary rapidity with which this substance in some instances acts would seem to put it outside the class of ordinary therapeutic agents. I have known an empyema which had been discharging for weeks, the child rapidly getting worse, heal up in a day or two and the patient recover in about a week from the administration of one teaspoonful of calcium (collosol) by the mouth at night. Ischio-rectal abscesses often of long duration will sometimes heal soundly in a week. In the case of the child quoted this effect could not be due to suggestion. Tuberculous glands may disappear rapidly. I am not wishing it to be inferred that these favourable results occur in every case, but they do occur in some cases. Last year I was consulted by a young man who was suffering so severely from hay fever that he was unable to go to work. I ordered him one teaspoonful of collosol calcium by the mouth at night, and in a few days he was quite well; he took a little of the calcium this year, and was untroubled. This year I was consulted by a lady, aged 26, who since 1921 had been very much troubled with hay fever, commencing in April and lasting till September, often being unable to go out, and her life a complete burden. I ordered her one teaspoonful of collosol calcium at night; she took this for six weeks and was no more troubled, even if she went into hayfields; she told me that this was the first summer she had been able to enjoy for years. I do not offer any explanation of the action of this substance, but that it does act I have no doubt.—I am, etc.,

EDWARD E. PREST.

Ayrshire Sanatorium, Glenafton,
New Cumnock, Oct. 29th.

CURE OF VARICOSE VEINS BY PUNCTURE.

SIR,—Much has been written of late on the treatment of varicose veins by injection, and different formulae are recommended. I have followed the literature with interest, but have not yet made use of the method.

To-day I have had an experience which has surprised me and may be of interest. Two months ago a lady was recommended by a specialist to have a series of intramuscular injections of her own blood (5 c.cm.), and she came into my hands. Her arms were adipose, and there seemed no chance of finding the veins at the elbow without dissection.

She had a group of varicose veins in the left leg below the knee, and blood was drawn from these on six occasions. Six weeks later she wrote that she had had a slight recurrence of her skin trouble—much less severe than in any previous attack. She thought the treatment had done good—might she have a second series? On visiting her I searched in vain for her varicose veins. They had disappeared!—I am, etc.,

CLAUDE WILSON, M.D., M.R.C.P.

Tunbridge Wells, Nov. 14th.

QUININE BIHYDROCHLORIDE IN OBSTETRICS.

SIR,—I can corroborate what Dr. Steel says (November 5th, p. 827) about the value of quinine bihydrochloride in the treatment of puerperal sepsis. When practising in the East I saw many such cases (which had been attended by native nurses) and I never failed to effect a cure after the second injection. My first case was in the jungle, many miles away from civilization—a multipara, who had been confined four days previously. She had a temperature of 106°, intense pains in the head and abdomen, and a foul discharge. I gave her an injection of 10 grains of quinine bihydrochloride. When I saw her early next morning the temperature was 99°, and she had expelled a large mass of membranes. I gave her another injection that night and she made an uneventful recovery.

Since coming home I have seen three similar cases, adopted the same treatment, and had equally good results. I always carry a supply of ampoules (P. D. & Co.) in my midwifery bag.—I am, etc.,

Bourton-on-the-Water, Nov. 11th. PROSPER LISTON.

JOHN OF GADDESDEN.

SIR,—One hesitates at any time to intrude upon the expressed opinions of an obituary notice, and especially is this so when the subject of it is a scholarly ornament of the profession like the late Dr. H. P. Cholmeley; but there is one unfortunate sentence in the excellent appreciation published in your issue of November 12th (p. 902)—unfortunate both in substance and in setting, for even if it were true there seems no justification for associating it with the work or opinions of Dr. Cholmeley, and it is this: "the suggestion has been made that he [John of Gaddesden] was perhaps the original of Chaucer's 'Doctour of Physic' in the Prologue to the *Canterbury Tales*."

There is no suggestion of this in any chapter of Dr. Cholmeley's book *John of Gaddesden and the Rosa Medicinae;* indeed, there is one reference which might be construed in quite a contrary direction. On page 71 he points out that, although the *Rosa* is full of the beliefs and false pathology of the time, Gaddesden makes scarcely any mention of astrological matters. In this he differs from his notable contemporary, John of Burgundy, who, in his treatise *De Pestilentia*, lays it down as a necessity that those who presume to treat the plague should be well grounded in a knowledge of the stars. Chaucer's description runs:

> "With us ther was a Doctour of Phisyk,
> In al this world ne was ther noon him lyk
> To speke of phisik and of surgerye;
> For he was well grounded in astronomye."

A few lines later, after referring to his doctor's knowledge of "Esculapius, Ypocras, and Galien," he speaks of the works of Bernard (of Gordon), Gilbertyn (Gilbertus Anglicus), and Gaddesden as forming part of his equipment. Chaucer had travelled far and read widely, and the "Doctour" is probably a composite picture; it is certainly more flattering to the medical profession than most mediaeval accounts are.—I am, etc.,

Victoria Infirmary, Glasgow, Nov. 12th. J. A. M. CAMERON.

*** We did not imply that the suggestion was made by Dr. Cholmeley. Sir Norman Moore, in his article on John of Gaddesden in the *Dictionary of National Biography*, wrote: "His disposition, his peculiarities, and his reading are so precisely those of the 'Doctour of Physik' in Chaucer's Prologue that it seems possible that Gaddesden is the contemporary from whom Chaucer drew this character."

LUNACY LEGISLATION.

SIR,—At the discussion at the Representative Meeting upon the report of the Royal Commission I pointed out that legislation might be introduced before the next Annual Meeting.

The Lord Chancellor at Northampton told us that the Cabinet was considering the report. The Minister of Health has said that the matter is urgent, and the Chairman of the Board of Control has spoken in similar terms. In these circumstances I would urge that the British Medical Association should formulate its policy forthwith and that such policy should be supported by all members of the Association.

It will be impossible to construct a scheme which would meet the wishes of every individual, but the present is a golden opportunity for improving the position of medical men in dealing with mental disease.—I am, etc.,

Brentwood, Nov. 9th. H. G. L. HAYNES.

*** The importance and urgency of the matter is fully realized at the headquarters of the Association. The Lunacy Law Committee is meeting this day (Friday, November 18th), and may be expected to place its views before the meeting of the Council to be held on December 14th. The Council is acting on the assumption that early legislation is possible, if not probable.

REFRACTION "HOSPITAL."

SIR,—My attention has just been drawn to a letter in the issue of October 29th, signed "N. Bishop Harman," in which reference is made to the "London Refraction Hospital," in which it is stated:

> "This so-called hospital is no more than a meeting place where opticians collect some few patients, examine their eyes according to their capacity, and instruct their neophytes in their methods."

The writer is evidently in complete ignorance of the facts. The number of patients attending the "Refraction Hospital" runs into some thousands per annum, less than a third of whom are sent by opticians. The opticians upon the staff, in addition to their usual training in refraction, have had the privilege of personal instruction in the detection of disease by ophthalmic surgeons.

The writer also states that the "London Refraction Hospital" "would seem to be an attempt to combat the finding of the report of the Departmental Committee on the causes and prevention of blindness." The hospital building was purchased and the organization arranged some time before the report was published, and before its contents could be known.

With regard to the word "hospital," the latest English dictionary defines it as a building . . . for the benefit of any class of persons requiring public help.—I am, etc.,

The Refraction Hospital, London, S.E.1, Nov. 9th. FRAS. T. GREGG, Secretary.

*** We have referred this letter to Mr. Bishop Harman, who writes: Mr. Gregg may perhaps find support for the comprehensive meaning that he wishes to attach to the term "hospital" in the fact that there is to be found in one part of London a "dolls' hospital" and in another a "hospital for umbrellas." Whatever remote definition may be extracted from a particular dictionary, it will hardly be contested that in customary speech "hospital" means an organization where medical advice is to be obtained. When, therefore, Mr. Gregg's friends send their customers to "the hospital," can there be any doubt that the great majority of persons so directed believe they are going to an institution staffed by qualified medical practitioners? The suggestion that opticians, destitute of anatomical, physiological, and pathological training, can be made competent to examine the eye in such a fashion as to exclude the possibility of disease is, of course, absurd, and

still more absurd is the proposition that persons so "instructed" are efficient guides to succeeding generations of their junior colleagues. As Mr. Gregg claims that his institution provides "public" help, it would be interesting to see the annual report and balance sheet, together with the names of the managers and supporters of the institution; we should thus learn the exact area from which this "public" support is supplied and the quality of the independent committee which governs the whole organization.

"THE HISTORICAL ASPECTS OF QUACKERY."

SIR,—Dr. Kenelm Reid wishes me to say that no properly qualified doctor can legitimately be called a quack, whatever the nature of his belief. Sir James Barr, however, has recently (October 15th, p. 704) expressed the opinion that "it would seem to me that in this country there are more qualified than unqualified quacks."

I suggest that Dr. Kenelm Reid should settle this question with his friend Sir James Barr instead of demanding my opinion.—I am, etc.,

Edinburgh, Nov. 12th. A. J. CLARK.

*** This correspondence seems to have reached a stage at which it cannot profitably be continued.

THERAPEUTIC ABORTION.

SIR,—Dr. Binnie Dunlop has kindly defined the term "therapeutic abortion" as "abortion performed by a medical practitioner on purely medical—that is, pathological—grounds," although he does not outline these medical grounds nor describe the pathological investigations carried out. He further states that "abortion obviously protects family life . . . where it preserves the health or life of the mother of a family" (whether he intends to exclude the primiparous woman I do not know). This is dangerous doctrine. Will he show us before he performs an abortion that he will, with certainty, preserve the health or life of the patient? Again, if he be logical in his belief, may I not ask him to kill off some of the very numerous old people whose inconsiderate demands for attention from their married daughters do, I assure him, definitely damage the health of these mothers of families? After all, they are finished with their life's work, whilst the infants of whom he recommends the slaughter have not yet started theirs, and are much greater assets to the State.

If abortions are to be procured on the grounds that the health or life of mothers of families is endangered, then abortion should terminate every case of pregnancy, for pregnancy is never quite safe; 3,000 women were killed by pregnancy last year. Dr. Dunlop excludes from the term "illegal abortion" cases of pregnancy following rape. These are admittedly hard cases, but "hard cases make bad law," and another platitude asserts that "two wrongs cannot make a right." May I suggest to Dr. Dunlop that he may not exclude any intentionally produced abortion from the term "illegal abortion"? There is in this country no such thing as a legal abortion, as some in our profession may find out one day to their cost.

Seriously, Sir, some of us are greatly concerned at the number of abortions performed at the present day, and suspect that they are more easily obtained by the rich than by the poor. A case mentioned last year in the JOURNAL was that of a barrister's wife who "did not want a baby." If women marry they assume certain responsibilities, and it is not for the medical profession to enable them to shuffle out of these responsibilities.

We general practitioners who do not perform abortions see Nature produce living healthy babies in all kinds of apparently impossible circumstances. I have seen a woman with acute heart failure at the fourth month go to term and produce a healthy child. I have seen grossly tuberculous women produce healthy babies and recover. We wish to see less interference with Nature. Nature can well look after herself, and, working unhampered, will produce healthy babies to carry on the race. There is no need to replace the term "meddlesome midwifery" with that of "meddlesome abortion."—I am, etc.,

London, N.W.5, Nov. 11th. P. P. DALTON.

HOSPITAL POLICY.

SIR,—It is high time the medical profession tackled the question of hospital policy in earnest. Why are hospital staffs so keen on the voluntary principle, and why will they not carry out the declared policy of the British Medical Association? Is not the profession ashamed of the methods which have been used for raising funds for voluntary hospitals? Would not it be more dignified to accept State aid on agreed terms? Cannot the profession see that the hospital clubs will eventually lead to the same position, as did the old friendly society and other kind of clubs? What is going to be the effect of all the clinics and the hospital out-patient departments upon the general practitioner? To my mind the last question is the most important of all.—I am, etc.,

Southend-on-Sea, Nov. 14th. FERDINAND REES, M.D.

ASSISTED EDUCATION OF DENTISTS.

SIR,—From time to time, in my capacity as Registrar of the General Medical Council, I am asked whether I know of any fund from which the sons or dependents of medical men can receive financial assistance to enter the medical profession, and my reply has to be that some of the medical schools have scholarships for this purpose, but, apart from this, I do not know of any fund from which they can be assisted.

With regard to dentistry, however, the position is different. Unless the entry of students to the dental profession is increased, it is not improbable that in process of time there may be a shortage of dentists to attend to the needs of the public. In suitable cases, therefore, in which the requirements of the General Medical Council for the registration of students have been satisfied, the board is prepared to give financial assistance, by means of bursaries, to pay the cost of fees and instruments, and in some cases maintenance is given in addition.

So far as is known, there is scarcely any other great profession for the entrance of which such facilities are provided. As it is possible that medical practitioners may know of cases in which young men, in every way suitable for entering the profession of dentistry, are debarred from so doing by lack of means it is desirable that the assistance offered by the Dental Board should be made known.

Further information will gladly be sent on application to this office. All letters should be addressed to "The Registrar of the Dental Board," 44, Hallam Street, W.1.—I am, etc.,

November 15th. NORMAN C. KING.

Obituary.

JOHN SINGLETON DARLING, M.D., M.CH.,

Late President, North of Ireland Branch, British Medical Association.

WE greatly regret to record the death, on November 8th, of Dr. J. Singleton Darling, at his residence in Lurgan, Armagh, at the age of 71. Dr. Darling received his medical education at Trinity College, Dublin. In 1879 he graduated M.B.Dublin, and obtained the Diploma L.M., R.U.I.; in the following year he became B.Ch., and in 1909 proceeded M.D., M.Ch. In the last year of his studentship he obtained a travelling scholarship and studied in Vienna. After practising for a short time in the West of Ireland he went to Lurgan in 1883, and was appointed medical officer of the Lurgan workhouse infirmary seven years later. As the result of his work and inspiration the infirmary came to be regarded as a valuable school of surgery, and Dr. Darling became renowned throughout Ulster as a skilful operating surgeon. After the war the hospital was officially recognized by the Government as a centre for the treatment of ex-soldiers.

Throughout his medical career Dr. Darling did all in his power to further the interests of the British Medical Association. He was a member of the North of Ireland Branch Council from 1897 to 1899, vice-president in 1900, and president in the following year. He was honorary treasurer of the Ulster Branch and a member of the Branch Council from 1903 to 1927, and during the same period honorary secretary of the Portadown and West Down Division. He

represented the Branch on the Council of the Association without a break from 1914 to 1927. Dr. Darling was a member of the Irish Committee from 1909 to 1911, and from 1923 to 1927; of the Finance and Executive Sub-committee of that committee from 1923 to 1924; he was a member also of the Insurance Acts Committee from 1920 to 1922. At the Annual Meeting of the Association in Belfast in 1909 he was vice-president of the Section of Obstetrics and Gynaecology. He had also held office as president of the Ulster Medical Society.

In addition to his deservedly high standing in the medical profession Dr. Darling won the respect and affection of all who came in close contact with him. He will be sadly missed by his patients and the inhabitants of Lurgan, and his loss will be deeply felt by his colleagues in the medical profession throughout the North of Ireland and on the Council of the British Medical Association. He was twice married.

Dr. Alfred Cox (Medical Secretary of the British Medical Association) writes: With Darling disappears one of my oldest friends in the Association and one who for many years embodied the work and influence of the Association in Ireland as few other men did. To Darling it was that we naturally turned for information about what was going on in Ulster; he was the man who was just as naturally asked to do anything we wanted doing in Ulster, and we were always certain that he would not fail us. He was a splendid influence in promoting medical unity, and he did as much as any man to prove that there was no line of demarcation in Ireland between members of the medical profession, whatever the political situation might be. His genial disposition and obvious sincerity made him a general favourite in the Council and the Representative Meeting, members of which bodies will join with their colleagues in Ireland in mourning the loss of a good man.

JONATHAN DALGLIESH, M.R.C.S., L.S.A.,

Newcastle-on-Tyne.

By the death on November 9th of Dr. Jonathan Dalgliesh Newcastle-on-Tyne lost her oldest medical practitioner. He was born in North Shields on February 2nd, 1839, and although he had outlived all his professional contemporaries there are still members of many families in the city to whom he had rendered kindly services, and by whom his memory is cherished. A student of the Newcastle College of Medicine, he completed his medical curriculum in London. Returning to the northern metropolis he became assistant to Dr. Raine, a well known and popular medical practitioner in his day, who was surgeon to the North Eastern Railway Company. Dr. Dalgliesh commenced practice on his own account in Westgate Road, then a residential street; he gradually built up a large connexion and subsequently removed to West Parade, where he lived until 1901. During these years he led an extremely active life. He was one of the fast disappearing type of the "good old family doctor"; guide, and friend, as well as medical adviser. On January 1st, 1864, Dr. Dalgliesh was appointed a district medical officer under the guardians, a position which he held until June 24th, 1901, when he retired with a pension after thirty-seven years of Poor Law service. He was one of the first six medical men to become a public vaccinator for the city in 1872, a year after the second Public Vaccination Act became law. The first Act was passed in 1867, and although there is no record of the fact it is more than likely in the intervening period he discharged such duties as this Act required.

In the later years of the past century he conducted a mission in Surgeons' Hall on Sunday evenings. He retired temporarily to Harrogate, where five months afterwards his wife died, and he returned to Newcastle; he established a medical mission in Shieldfield, one of the crowded working-class districts, which he carried on single-handed for eleven years. While warmly interested in mission work he was not only a keen Biblical student and an example of the application of the tenets of the New Testament to daily life, but equally a close student of medicine, even in his declining years. He bought and read the newest editions of standard books on medicine, so that his library was kept up to date until the last few years, when he began to suffer from cataract; this was a great blow, for he loved books. Unfortunately the blow was further embittered by great loss of hearing. These deprivations he bore with fortitude and patience, an example to all who came into contact with him and an illustration of the triumph of the faith which sustained him. A friend to all and an enemy of none, his funeral, in Old Lomond Cemetery on November 12th, where he was buried beside the remains of his wife, was attended by the civic dignitaries and members of the public bodies of the city, and a few of his old medical friends and patients.

One of his sons, an ophthalmic surgeon, died in Sunderland in 1910. Of the four sons who survive him Dr. John Dalgliesh is a medical practitioner in Sutton, Surrey; one, Mr. Robert Stanley Dalgliesh, had just closed his year of office as a much appreciated sheriff of Newcastle on the day his father died; one son lives in Yorkshire, and the other in New Zealand. Three married daughters survive him.

T. O.

SIR PETER O'CONNELL, M.D., M.Ch.,

Consulting Surgeon, Mater Infirmorum Hospital, Belfast.

There was universal regret when it became known in Belfast that Sir Peter R. O'Connell had passed away on September 24th at Marseilles, where he had gone on holiday. Peter O'Connell, who was born in co. Cavan, went to Belfast when a young man in 1883, after graduating M.D., M.Ch., R.U.I., and post-graduate study in Dublin, London, and the Continent. His reputation had preceded him, and the nucleus of the present Mater Infirmorum Hospital was founded by him in association with a few colleagues. There he laboured hard, and as a result the present hospital was opened in 1900 with 200 beds. He was then appointed senior surgeon. In this sphere he had ample scope for his work, and soon his operative skill and highly valued opinion brought him patients from all over Ulster. Though busily engaged in practice, he found time for writing on various subjects, and became interested in societies for the improvement of the people. He was prominent as a speaker, and was elected an alderman of the city of Belfast. In the corporation he took a keen interest in public health, technical, and education matters. He was elected High Sheriff of the city in 1907 by men who differed from him both in religion and politics, but who recognized his great ability, and he was created a Knight Bachelor in 1908. He was also a deputy lieutenant for the city. He was a member of the commission which inquired into university education in Ireland and brought about the establishment of the National and Queen's Universities; he was appointed a senator of the latter, and acted as lecturer and examiner in surgery. He was elected president of the Ulster Medical Society in 1910-11. He retired some half-dozen years ago, and went to reside in the neighbourhood of Dublin. A colleague writes: In the Mater we shall miss his genial presence, his candid advice, his sallies of wit, and his professional skill; but his name and fame are writ large in its history, where he laboured for nearly forty years, and future generations will learn the deep debt they owe to "Sir Peter." To his widow, Lady O'Connell, daughter of Edward Hughes, J.P., we tender our most sincere sympathy, and pray that time may assuage the great loss she has sustained.

The following well known foreign medical men have recently died: Professor Max von Gruber, for many years director of the Institute of Hygiene at Munich, and later president of the Bavarian Academy of Sciences, aged 75; Dr. Otto Roth, formerly professor of hygiene and bacteriology at Zürich, aged 75; Dr. Jean Louis Prevost, formerly professor of physiology at Geneva, aged 87; Geh. Max Reichert, one of the oldest specialist in oto-rhino-laryngology, aged 82; and Dr. Kirmisson, formerly professor of the surgery of children and orthopaedics at the Paris Faculty of Medicine, and surgeon to the Hôpital des Enfants Malades, Paris.

Universities and Colleges.

UNIVERSITY OF CAMBRIDGE.

At a congregation held on November 12th the following medical degrees were conferred:

M.B., B.Chir.—J. L. Warner.
M.B.—W. H. Craib.

UNIVERSITY OF BIRMINGHAM.

The following prize medals awarded for the past session were distributed at the meeting of the Faculty of Medicine, held on November 11th, by the Vice-Chancellor and Principal (Dr. C. Grant Robertson): *Arthur Foxwell Memorial Medal* (Gold Medal awarded on Clinical Medicine, Final M.B., Ch.B. Examination); Marjorie V. Martin. *Sampson Gamgee Memorial Medal for Surgery* (Gold Medal awarded at Final M.B., Ch.B. Examination): K. P. Fooks. *Prizes awarded by the University Clinical Board:* Senior Medical Prize (Gold Medal), Frances M. Stockdale; Senior Surgical Prize (Gold Medal), V. Goldman; Midwifery Prize (Gold Medal), R. Anderson; Junior Medical Prize (Silver Medal), J. W. Notley; Junior Surgical Prize (Silver Medal), Beatrice M. Willmott.

UNIVERSITY OF GLASGOW.

At the congregation on November 12th the degrees of M.B., Ch.B. were conferred upon Eric Dow, and that of B.Sc. in Pure Science on Martha Cleland, M.B.

ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.

The following officers have been elected for the ensuing year: *President:* Dr. G. H. Edington. *Visitor:* Dr. John F. Fergus. *Honorary Treasurer:* Mr. J. H. MacDonald. *Honorary Librarian:* Dr. E. H. L. Oliphant. *Representative on the General Medical Council:* Dr. James A. Adams. Councillors: The above-named office bearers, *ex-officio*, together with Dr. John Henderson, Dr. H. L. G. Leask, Mr. R. Barclay Ness, Dr. T. K. Monro, Dr. W. G. Dun, Mr. J. Forbes Webster, Dr. J. M. Munro Kerr, Mr. Thomas Kay, Mr. John Patrick, and Mr. R. M. Buchanan.

S. A. M. Sepher (Hong-Kong) has been admitted (after examination) as a Fellow of Faculty.

At the general meeting of the Faculty on November 7th Dr. G. H. Edington, the new president, was invested with a badge of office, presented by his predecessor, Mr. R. M. Buchanan.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

An ordinary Council meeting was held on November 10th, when the President, Sir Berkeley Moynihan, was in the chair.

Diplomas.

Diplomas of Membership were granted to 178 candidates.

Examiner.

Mr. Herbert Tilley was appointed to examine for the Diploma in Laryngology and Otology in December, in place of Mr. A. H. Cheatle, resigned.

International Congress of Military Medicine and Pharmacy.

Sir Anthony Bowlby was nominated to serve on the organizing committee of the fifth International Congress of Military Medicine and Pharmacy, to be held in London from May 6th to 11th, 1929.

Members and Direct Representation.

In reference to the resolution carried at the last annual meeting of Fellows and Members, the following resolution was unanimously adopted:

"That in view of the result of the recent postal vote of the Fellows the Council is not prepared to take steps at the present time for altering the constitution of the College so as to give Members of the College direct representation on the Council."

Retirement of Mr. Hallett.

The following resolution was passed:

"On the occasion of the retirement of Mr. Frederic G. Hallett from the offices of Secretary to the Conjoint Examining Board and Director of Examinations in the Royal College of Surgeons, the Council desire to place on record their high appreciation of his services and the very warm regard which they entertain for him personally. Mr. Hallett's powers of organization, his long experience in all matters relating to examinations, and his exceptional knowledge of regulations for medical education in this and other countries have been of great advantage to the College, and have given his services a special value and caused them to be held in the highest regard. The Council are fully conscious of the ability and zeal with which Mr. Hallett has carried out his duties during the long period of fifty years, and they trust that health and happiness may enable him to enjoy in his retirement the rest which he has earned so well. His unfailing courtesy and readiness to help will not be forgotten by those who have had the pleasure of being associated with him in the control and management of the affairs of the College, and the Council assure him that he carries with him their best wishes for his welfare in years to come."

Medico-Legal.

BRITISH MEDICAL ASSOCIATION *v.* ALBERT PARTON AND PARTONS LIMITED.

Motion for Infringement of Copyright: Perpetual Injunction Granted.

In the High Court of Justice, Chancery Division, before Mr. Justice Romer, on November 16th, the British Medical Association applied for an injunction to restrain Albert Parton and Partons Limited, of New Cross Road, London, from publishing or distributing a pamphlet which, they alleged, infringed their copyright.

Mr. C. A. Bennett, K.C., and Mr. H. C. Dickens were counsel for the British Medical Association, instructed by Messrs. Hempson. Mr. Parton conducted his own case.

Mr. Bennett said that the copyright which the plaintiffs, the British Medical Association, declared to be infringed, was in two of their publications, *Secret Remedies* and *More Secret Remedies*, and the infringement was in a pamphlet published by the defendants called *The Greatest Exposure of Modern Times: Patent Medicines (so called), What they cost and what they contain, as exposed by the British Medical Association.* When the case came previously before the court his lordship suggested to Mr. Parton that he should consult solicitors. He had done so, and at the beginning of last week the British Medical Association received a letter from the solicitors stating that they had gone into this matter with the defendants. Mr. Parton, as was to be gathered from his previous statement in court, was contending that under Section 10 of the Copyright Act, 1911, proceedings for infringement of copyright had to be taken within three years of infringement. He had been advised, however, that his offence was a continuing one, and in these circumstances defendant had expressed his willingness to attend at the adjourned hearing of the motion, that day, and to raise no further objection. He was also prepared, in order to avoid expense, to agree that the motion should be considered as the trial of the action. The British Medical Association was quite willing to put an end to the matter on these terms. There were, however, two defendants, Mr. Parton and a limited company, of which he was the principal director and a substantial holder of the shares, and neither he nor the company had as yet "entered an appearance."

His lordship said that all he could do was to grant an injunction until the trial. In the meantime, the two defendants agreeing, that motion could be treated as the trial, and the injunction made perpetual during copyright. He understood that the Association did not ask for damages.

Counsel said that his clients did not ask for damages, but they did ask that defendants should deliver up on oath all copies of the pamphlet in their possession or power, and all printed sheets and type used for their production. He thought he was entitled to ask for that, also the costs of the motion.

His lordship agreed, and, addressing Mr. Parton, said that no doubt he had heard what counsel had said. Defendants had not what was called "entered an appearance." No doubt Mr. Parton for himself, if not for his company, could enter an appearance that day by attending before the learned registrar, giving his consent to the terms mentioned, and then no further costs would be incurred.

Mr. Parton said that he would do this.

Counsel said that there was one other matter. This was only a motion for infringement of copyright, but defendant had been addressing meetings at which he had tried to sell the remedies in circumstances which suggested that he was acting under the auspices of the British Medical Association. Counsel only desired to say that if he continued to do this it might be necessary to take other proceedings to stop him. The British Medical Association had no connexion with him at all.

Mr. Parton said that on his new flag, which he had used during the last three months, he had made no mention of the British Medical Association.

His lordship said that Mr. Parton would be well advised to cease to make any reference to the British Medical Association, and especially not to suggest that he had any connexion with them. His lordship then, subject to Mr. Parton and his company "entering an appearance," granted the perpetual injunction asked for, with delivery up of copies of the pamphlet, and costs against the defendants.

A CONSULTANT'S FEE.

At the West London County Court, on November 14th, before His Honour Deputy Judge Ralph Thomas, Sir Thomas Horder, Bt., M.D., was sued by Mr. Robert Sidney Provis, described as a "consultant in blood diseases," of West Kensington, for the return of five guineas, a consultation fee. Sir Thomas Horder

was represented by Mr. Michael Rowe, barrister. Mr. Provis conducted his own case.

Mr. Provis testified that between 1918 and 1925 three of his brothers died from pernicious anaemia, and he himself, towards the end of that period, contracted the disease. He consulted many medical men in this country and abroad, and all of them gave him the same "dreadful poisons to imbibe." Eventually he consulted Sir Thomas Horder, who asked him if he had had any injections, and said that he would prescribe six injections, the nature of which he was not told. He asked Sir Thomas whether this would cure him, and Sir Thomas replied, "No, but it will help you." The prescription was sent to Dr. Spurgin of Bramhall, together with a letter which Dr. Spurgin said he had mislaid, and by Dr. Spurgin he was told that the six injections were of salvarsan, and that they could not be put into his body because he "had no veins." He then went to Dr. Arnold Renshaw of Manchester, who gave him the first injection, which passed off harmlessly—and uselessly. On the second occasion Dr. Renshaw missed the vein, with the result that the witness suffered intense agony, and "it was only my own knowledge of the blood stream that enabled me to prevent that poison reaching my trunk." (At this point the judge remarked that he would hear better if the plaintiff did not address himself to the press.) Continuing, Mr. Provis said that since that time he had himself started in practice as a "non-orthodox healer."

His Honour: How does that affect your case?

Plaintiff: It has shown me that Sir Thomas Horder did not understand my case. It was a wrong diagnosis and wrong treatment. I cured myself, and I have cured others since. I maintain that Sir Thomas Horder took five guineas from me for a prescription which was not only useless but endangered my life. I ask for the return of the five guineas. If a tradesman sold me five guineas' worth of bad meat I should have my redress in court. I do not ask for damages.

Cross-examined, the plaintiff was asked if salvarsan was not a remedy very commonly given, to which he replied, "Very common, unfortunately." On another question, whether in the existing state of medical science it was not the best remedy, the judge interjected, "Is he in a position to know that? He is an unorthodox healer, which means an unqualified practitioner." Several letters which the plaintiff had written to Sir Thomas Horder were put in. One of them contained a cutting from the *Daily Express* advertising Mr. Provis, and the remark was written thereon by Mr. Provis, in what he admitted to be a different handwriting from that used in the other letters, "This man [meaning himself] is no fool."

The judge called attention to the letter heading "R. S. Provis, Director of Natural Therapeutics," and to his assumption of the title "Doctor," and asked Mr. Provis who gave him his degree.

Plaintiff: I claim the degree because there is nobody in this country who can test my knowledge.

His Honour: You are not entitled to call yourself a doctor?

Plaintiff: "Doctor" only means "teacher."

His Honour: You have no degree?

Plaintiff: No degree recognized by the Government at the moment.

His Honour: Have you a degree which is not recognized? Who granted you your degree?

Plaintiff: Almighty God, who endowed me with the most marvellous power of healing and preaching.

Extracts from other letters written by the plaintiff to Sir Thomas Horder were read. One of them, headed "*re* White Loaf," contained the sentence, "Large millers of white flour are not without interest in your lies." Another ran, "It is my intention to let the public know you are a liar," and another, "I am not afraid of the old B.M.A." The plaintiff also stated that he had discovered the cause of cancer and consumption, and that he had himself treated "lots of cases of cancer which have gone west."

His Honour: What do you mean by that—that the patients died?

Plaintiff: Oh, no; the patients recovered; it was the cancer that "went west."

He added, on further cross-examination, that it was not until he became acquainted with the Spahlinger controversy that he realized that the treatment prescribed by Sir Thomas Horder was really blood poisoning. He knew that he had had blood poisoning in consequence of the treatment, but he was not aware until that controversy that blood poisoning was "part of the game." He was anxious to challenge Sir Thomas Horder to debate on the "white loaf" and other questions, and was ready to engage a hall, but he had not seized the present occasion for publicity; he wanted only the return of his fee.

Counsel for Sir Thomas Horder submitted that there was no cause of action. There could be no question of negligence in administration so far as Sir Thomas Horder was concerned; moreover, plaintiff had admitted that Sir Thomas Horder had not promised to cure him. He could hardly deny that he was given a remedy commonly used by medical practitioners, nor that he received the best advice available when he consulted Sir Thomas Horder.

Plaintiff, in a final speech on his own behalf, said that Sir Thomas Horder did not get his money until he had assured the plaintiff that what he was prescribing would help him. He maintained that if one went to a high authority in the medical profession one expected something better than from a "ten-and-sixpenny practitioner."

Judgement for Sir Thomas Horder.

His honour, in giving judgement, said that plaintiff was not suggesting that the fee was excessive, but only that the result of the treatment advised by Sir Thomas Horder was that he got blood poisoning. His honour agreed with the submission made by counsel for the defendant that there was no warranty or guarantee in this case in any way. Plaintiff asked Sir Thomas Horder for his advice, Sir Thomas Horder gave his advice, and it was not suggested that there was anything improper about that advice. Any improper administration of the injection such as plaintiff alleged could not, of course, be brought against Sir Thomas Horder; moreover, the plaintiff himself said that he was not seeking to recover damages for anything that Sir Thomas Horder had done. The letters which had been put in, and plaintiff's attitude in the witness-box, made one suspect that this action was not genuinely started for the purpose of recovering a fee paid to Sir Thomas Horder. He found for the defendant, with costs, and refused leave to appeal.

Medical Notes in Parliament.

THE Parliamentary Medical Committee is to meet on November 24th to discuss the prospects of the Nursing Homes Bill and Mental Deficiency Bill, and also Dr. Little's bill regarding medical confidences. A letter from him on this subject is published at page 957. The Parliamentary Medical Committee has not been consulted in the preparation of the bill. A deputation of medical members of Parliament to the Minister of Health on the same subject had previously been suggested, though no arrangements had been made for it. The text of the bill is as follows:

BE it enacted by the King's Most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:

1. Any information obtained by a duly registered medical practitioner in regard to any person treated for venereal disease under a scheme approved in pursuance of Article II (2) of the Public Health (Venereal Diseases) Regulations, 1916, S.R. & O., 1916 (No. 467), shall be regarded as confidential, and shall be privileged from disclosure under the court of law.

Provided that the information obtained shall have been obtained for the purpose of a cure or assisting in a cure of a person so treated.

And provided also that this privilege shall not extend to any communication made with the object of committing or aiding in committing any fraud or crime.

2. For the purpose of this Act "Duly registered medical practitioner" shall mean a person whose name is on the *Medical Register*.

3. This Act shall be called the Medical Practitioners' Communications Privilege Act, 1927.

The Government, which controls all the time of the House till the end of the session, has not promised facilities for discussion.

Landlord and Tenant Bill: Goodwill.

The Landlord and Tenant Bill, introduced by the Government to provide a remedy for hardships to business tenants under leases granted after its passage into law, was considered by the House of Commons on report on November 11th. Mr. Wellock moved to extend to premises occupied for professional purposes the provision that compensation could be claimed for goodwill. He said that doctors had come together in particular areas in almost every town, and it was possible for a landlord to turn out one and bring in another, thus gaining the advantage of any improvements which had been made. Sir William Joynson-Hicks said there was a difference between the goodwill of a doctor and the goodwill of an ordinary tradesman. The Government had agreed while the bill was in Committee that the professional man should have compensation for improvements. It would be better to wait a few years to see how the Act ran before considering its extension to other classes of society. The Committee on the bill had unanimously accepted the compromise that professional men should be entitled to compensation for improvements, but not for goodwill. Mr. Dalton said that the doctor, dentist, or solicitor if given a choice would prefer compensation for goodwill to compensation for improvements, which he seldom had to make. Sir Philip Pilditch said the Committee had agreed that the doctor or the dentist should be given facilities for securing the authority of a tribunal for putting up such a building as a garage. Mr. Stephen remarked that a professional man who had to shift ten miles out could not expect his clients to follow him. Mr. Wellock asked for guidance on clause 16 (3), which provides that, in the case of premises used partly for purposes of a trade or business and partly for other purposes, the compensation for improvements and goodwill shall apply to improvements only if and so far as they are improvements in relation to the trade or business. He inquired whether this subsection, "in the case of a doctor in a well known doctors' area," would cover compensation in respect of that doctor's dispensary. The Home Secretary said that it would. The amendment was then defeated by 183 to 95 and the report stage was completed.

National Insurance.—On November 10th Mr. Chamberlain told Colonel Applin that approved societies had no power under the National Insurance Act to establish dental clinics, but a few clinics had been established by bodies indirectly associated with approved societies. He hoped soon to receive a report on the provision of dental treatment in clinics from the special committee representing approved societies and dentists to which he had referred the question. Answering Mr. Hardie, Mr. Chamberlain said that during August the average cost of a prescription under the National Health Insurance Act was in London 8.1d., Birmingham 7.8d., Manchester 8.9d., and Liverpool 8.5d. The average cost per

prescription for medicine for insured persons in Glasgow during August last—the latest month for which figures were available—was 13.41d. The Minister of Health has received from the Glamorgan Insurance Committee a letter protesting against Wales being ignored in the composition of the Pharmaceutical Distribution Committee. The committee, he stated, was constituted on the same lines as the Medical Distribution Committee, which has never contained any separate representation of the Welsh Insurance Committees. The two committees are already sufficiently large, and the Minister sees no necessity to increase them.

Extensions of Voluntary Hospitals.—In an answer to Mr. T. Williams on November 10th Mr. Chamberlain again said that he could not recommend any grant from public funds towards the cost of extensions of voluntary hospitals. Since the Onslow Commission reported a considerable number of new beds had been provided or were in course of provision.

Small-pox.—Sir Kingsley Wood, on November 14th, informed Dr. Vernon Davies that the numbers of cases of small-pox notified in August, September, and October were 564, 505, and 795 respectively. The total number of notifications from January 2nd last to November 5th inclusive, was 12,729. These figures were subject to revision. Sir J. Gilmour also told Dr. Davies that the numbers of cases of small-pox notified in Scotland during August, September, and October, 1927, were 5, 2, and nil respectively. The total number of cases of small-pox notified in Scotland from January 1st, 1927, to November 5th, 1927, was 166.

Baths at Poor Law Institutions.—Mr. Chamberlain, on November 14th, said his attention had been drawn to the remarks of the coroner at an inquest at Hammersmith regarding the death of a woman through drowning in a bath full of water at a hospital, she having taken a bath against instructions. He said the importance of having keys to all hot water taps in the bathrooms of Poor Law institutions had for many years been emphasized by the central authority. Such keys had now been fitted at this institution.

Proposed Medical Mission to China.—On November 14th Earl Winterton informed Mr. Thurtle that a proposed medical mission to China had been discouraged by the Indian Government because a grant of facilities for British subjects to serve as non-combatants with one or other of the contesting factions in the civil war in China would have been construed as a departure by the Government from its attitude of strict impartiality. The Government had advised British subjects to withdraw from the interior of China, in order to avoid embarrassing incidents, and it could not allow a party of British subjects to proceed to parts of China where such incidents were most likely.

Foot-and-Mouth Disease.—Mr. Guinness, replying on November 15th to Lord Apsley, said that the departmental committee which reported on foot-and-mouth disease in 1922 and 1925 expressed the view that the virus might be introduced from abroad through two classes of channels: (*a*) uncontrollable, such as the movement of birds and air-borne infection, and (*b*) controllable, such as the movement of human beings, importation of animals, feeding stuffs, packing materials, fodder, and meat. To prevent the introduction of disease through these agencies a number of Orders were in force, such as that prohibiting the import of hay and straw from countries in which foot-and-mouth disease was prevalent, and of fresh carcasses from the Continent. Other Orders were designed to prevent the spread of infection once it had occurred in this country.

Medical Inspector of Mines and Quarries.—On November 15th Colonel Lane-Fox, replying to Mr. Lunn, said that Dr. S. W. Fisher had been appointed medical inspector of mines and quarries. Since his demobilization in 1919 Dr. Fisher had practised in a colliery district in South Wales, where he had obtained general experience of mining conditions and of the treatment of mining accidents and disease. He had taken special interest in silicosis and nystagmus, in which he had carried out research work, and in beat-hand, beat-knee, and beat-elbow.

Notes in Brief.

Mr. Chamberlain told Sir Nicholas Grattan-Doyle on November 10th that he had no power to curtail the activities of birth control societies and similar agencies.

Mr. Chamberlain told Mr. Bromley on November 10th that he was communicating with the Lancashire County Council about the future use for tuberculous patients of the Luneside Sanatorium, Lancaster, in which three patients had lost their lives recently by the flooding of the institution. There was no suggestion that all reasonable precautions had not been taken.

In reply to a question Mr. Chamberlain said, on November 10th, that he was advised there was no danger that tuberculosis could be communicated to man by the consumption of fish. He did not propose to have investigations made with a view to prohibiting such sales.

Major Tryon states that no general instructions have been issued that the treatment allowances of men suffering from tuberculosis in consequence of war service should be withdrawn. The circumstances of each patient are considered in consultation with the responsible medical officer. The special difficulties which had arisen over such cases in the Ilford district were being investigated. The Minister of Health had considered the resolution passed by the Plymouth Insurance Committee urging the Government to enable and require local authorities dealing with tuberculosis—or groups of them—to formulate schemes for village settlements where suitable ex-sanatorium patients and their families could be housed and appropriate remunerative employment provided under medical supervision on the lines adopted at the Cambridgeshire tuberculosis colony at Papworth. There were three village settlements in existence, and a fourth was under consideration. Fuller experience of the results in these cases must be awaited before attempting such widespread and costly developments as the question suggested.

In the year ended June, 1927, 117,000,000 gallons of milk were brought into London by the four principal railway companies—an increase of 62 per cent. since 1923. At least 5,000,000 gallons a year are also brought in by road.

The Government of Burma has decided not to reopen the opium registers for Burman customers without a clear mandate from those affected.

The Prime Minister, on November 14th, told Mr. Looker that he was aware of the importance attached by governing bodies of institutions for mental defectives to the Mental Deficiency Bill, 1927, being passed into law at the earliest possible moment. He could not, however, add anything at present to his statement of last week about the prospect of facilities being given for its passage this session.

Medical News.

SIR BERKELEY MOYNIHAN will deliver the Mitchell Banks Memorial Lecture for 1927 in the Medical School of the University of Liverpool on Thursday, November 24th, at 4.30 p.m. The subject of the lecture, which is open to members of the medical profession, is "The gall bladder and its infections."

THE first International Conference on Light and Heat in Medicine and Surgery will be held at the Central Hall, Westminster, S.W., on December 13th to 16th. Among those who will read papers on various aspects of ultra-violet therapy and kindred subjects will be Professor Leonard Hill, Professor I. M. Heilbron, Dr. F. Hernaman-Johnson, Dr. F. Howard Humphris, Dr. H. Stanley Banks, and Dr. E. P. Cumberbatch. Foreign representatives who will read papers will include Dr. Jean Saidman (Paris), Dr. L. G. Dufestel (Paris), and Dr. Franz Nagelschmidt (Berlin). Each paper will be followed by a discussion. Applications for tickets should be made to the *British Journal of Actinotherapy*, 17, Featherstone Buildings, W.C.1.

THE annual reunion dinner of the British Serbian Units Branch of the British Legion and of all friends of Serbia will be held on Saturday, December 3rd, at 7.15, at the Victoria Mansions Restaurant, Victoria Street, Westminster. The president, the Rev. R. G. D. Laffan, will be in the chair. Tickets can be obtained from the honorary secretary, Miss Marx, 24, Melcombe Court, Dorset Square, N.W.1.

MR. A. EDMUNDS will deliver a lecture for the Fellowship of Medicine on practical surgical details at the Medical Society, 11, Chandos Street, on November 21st, at 5 p.m. On November 23rd, at 2.30 p.m., a special demonstration will be given at the Prince of Wales's General Hospital, Tottenham, N.15; on November 14th, at 2 p.m., Mr. Whitchurch Howell will give a surgical demonstration at the Queen's Hospital for Children; and on the same day, at 1 p.m., Mr. Whiting will give a demonstration at the Royal London Ophthalmic Hospital, City Road, E.C.1. The lecture and demonstrations are free to medical practitioners. From November 21st to December 17th there will be a daily series of lecture-demonstrations, illustrated by cases, at the West End Hospital for Nervous Diseases, at 5 p.m. A week's post-graduate course in diseases of the rectum will be held at St. Mark's Hospital from November 28th to December 3rd inclusive. Two afternoon courses begin on December 5th and continue for two weeks: one at the Infants Hospital, under the direction of Dr. Eric Pritchard, will cover all phases of the study of infants' diseases; and the other will be held at the Hospital for Diseases of the Skin, Blackfriars. During January the following courses will be arranged: in medicine, surgery, and the specialties at the Prince of Wales's General Hospital and associated hospitals; in cardiology at the National Hospital for Diseases of the Heart; in diseases of children at the Children's Clinic; and in psychological medicine at the Bethlem Royal Hospital. Syllabuses, tickets, and specimen copies of the *Post-Graduate Medical Journal*, may be obtained from the Secretary of the Fellowship of Medicine, 1, Wimpole Street, W.1.

A PRACTICAL course in the treatment of skin diseases and syphilis will be held at the Hôpital St. Louis, Paris, from November 28th to December 20th, under the direction of Professor Jeanselme, assisted by Professor Sebileau and the staff of the hospital. The fee is fr. 250. Further information can be obtained from M. Burnier, Pavillon Bazin, Hôpital St. Louis, Paris.

A POST-GRADUATE course in neurology and psychiatry will be held in English, from January 2nd to February 28th, 1928, in Vienna. Further information can be obtained from Dr. E. Spiegel, Falkestrasse 3, Vienna I.

DR. G. ARBOUR STEPHENS has been appointed an alderman of Swansea.

PROFESSOR R. B. WILD, who retired in September last from the Leech chair of materia medica and therapeutics in the University of Manchester, was presented on November 11th with his portrait by Francis Dodd, A.R.A., a set of Kipling's works, and an album of gramophone records of Beethoven's Symphony No. 3. The presentation was made by Professor G. R. Murray, on behalf of Professor Wild's past and present colleagues in the Faculty of Medicine, in appreciation of the valuable services he has rendered to the cause of medicine and education in Manchester. In accepting the gifts Professor Wild expressed a desire that the portrait should be given to the University, and the Vice-Chancellor gratefully accepted the offer.

THE Minister of Health and the Minister of Agriculture and Fisheries have appointed a Joint Advisory Committee, with Sir Horace Monro, K.C.B., as chairman, to consider and report on the position with regard to the pollution of rivers and streams, and on any legislative, administrative, or other measures which appear to them to be desirable for reducing such pollution. Among the members is Dr. H. M'Lean Wilson, chief inspector of the River Board of the West Riding of Yorkshire. Communications may be addressed to Mr. G. C. North, *M.C.*, one of the secretaries of the Committee, at the Ministry of Health, Whitehall, S.W.1.

A HOME OFFICE Order, which will come into force on December 1st, requires that suitable washing facilities shall be provided in all factories and workshops in which sugar is used in the processes of icing, creaming, and filling biscuits and wafers. A weekly inspection is also ordered for the detection of early signs of dermatitis of the hands and forearms, and in the event of any such susceptibility being detected arrangements must be made for the person to be transferred to work which will not expose him to contact with sugar.

AN inquest was held on November 14th at Poplar on the body of Mr. William Smart Harnett, aged 65, which was found in a dock last week. The medical evidence indicated that the body had apparently been in the water for ten or twelve days, and that death was due to asphyxia from drowning. Mr. Harnett will be remembered as the plaintiff in two prolonged lawsuits against medical men—Harnett *v.* Bond and Adam, and Harnett *v.* Fisher—both of which were fully reported at each stage in these columns. He had been missing from his home for over a fortnight before his body was found. The coroner in his summing up recalled that Mr. Harnett had been certified some time ago as insane; the fact that he was found, as the result of litigation, not to be insane could have had very small bearing on his recent actions; there was evidence that for the past four years or so he had acted perfectly normally. The jury without retiring brought in a verdict of "found drowned."

Letters, Notes, and Answers.

All communications in regard to editorial business should be addressed to ***The EDITOR, British Medical Journal, British Medical Association House, Tavistock Square, W.C.1.***

ORIGINAL ARTICLES and LETTERS forwarded for publication are understood to be offered to the BRITISH MEDICAL JOURNAL alone unless the contrary be stated. Correspondents who wish notice to be taken of their communications should authenticate them with their names, not necessarily for publication.

Authors desiring REPRINTS of their articles published in the BRITISH MEDICAL JOURNAL must communicate with the Financial Secretary and Business Manager, British Medical Association House, Tavistock Square, W.C.1, on receipt of proofs.

All communications with reference to ADVERTISEMENTS, as well as orders for copies of the JOURNAL, should be addressed to the Financial Secretary and Business Manager.

The ***TELEPHONE NUMBERS*** of the British Medical Association and the BRITISH MEDICAL JOURNAL are *MUSEUM 9861, 9862, 9863,* and *9864* (internal exchange, four lines).

The ***TELEGRAPHIC ADDRESSES*** are:

EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology Westcent, London.*

FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate Westcent, London.*

MEDICAL SECRETARY, *Mediocera Westcent, London.*

The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin*; telephone: 4737 Dublin), and of the Scottish Office, 6, Drumsheugh Gardens, Edinburgh (telegrams: *Associate, Edinburgh*; telephone: 24361 Edinburgh).

QUERIES AND ANSWERS.

"L. A." wishes to hear of an institution where a patient could receive "the latest treatment" of locomotor ataxia. There are no mental symptoms. Payment to cover the cost of keep could be made.

STOMACH COUGH.

A CORRESPONDENT sends us the following note of his own case: The inquiry by "M.B.Cantab." in your issue of November 5th describes a condition which I have observed for some years, though my case is not, as a rule, so acute. It is hard to understand a condition at once so acute and so quickly relieved, but I suppose that for the individual, at any rate, there is a very small margin between the normal acidity of the end of gastric digestion and an acidity which irritates the stomach wall. When the latter is established the patient is wakened by the discomfort and the pylorus contracts. Gulping of air, which is involuntary, but can be partly restrained by the will, goes on till the stomach is sufficiently distended to provoke violent and painful contraction, reflex coughing, and ultimately vomiting. A very small amount of sodium bicarbonate taken on waking so lowers the acidity and diminishes the irritation that the pylorus relaxes, the contents of the stomach begin to move on, and the passing of flatus, hitherto inhibited, tells the patient that the normal conditions of contraction passing down the bowel are resumed; he goes to sleep almost at once and has no reminders in the morning. The practical treatment, then, is a combination of two or three soda-mint tablets immediately on waking and a cocaine lozenge (such as Glaisyer and Kemp's pastil. menthol co.) slowly sucked. The latter probably stops the cough and greatly diminishes the risk of vomiting.

"J. B. S." writes: "M.B.Cantab." does not say his age, nor how his cough first began. In those disposed to bronchial coughs any undue exposure during the day brings a bill to be met by an attack of coughing in the morning; again, much persistent thinking brings a sensation in the epigastric region, often almost a soreness, and attended by some flatus in the same region. I have arrived at the age when the legs easily get cold—that gives me a cough in the morning, but no irritation in the throat. I find that gentle massage, with gulping, in the epigastric region and gentle pressure, including the neck, of some service. Diet tending to starvation as regards last meal.

CATARACT AND ULTRA-VIOLET LIGHT.

A MEDICAL CORRESPONDENT asks whether there is any reason to suppose that treatment of cataract with ultra-violet light is likely to benefit the condition.

*** We referred this question to Mr. Bishop Harman, who has been good enough to send the following reply: Ultra-violet light is injurious to the eyes. The naked arc, if it be focused on the macula, will cause a scotoma or blind spot which may leave permanent damage. Even when not actually focused by the eyes the rays will set up severe conjunctivitis, akin to the snow blindness of the high Alps. The preliminary report of the committee on the Causes and Prevention of Blindness reported at the request of the Minister of Health (Dr. Addison) on an outbreak of eye inflammation that had occurred in film studios. The attacks were due to the use of unfiltered or naked arc light rays. The mercury vapour lamp is milder in action but is capable of producing similar irritation if not screened. Users of ultra-violet ray apparatus need to take special precaution by the use of suitable glasses (not merely tinted, but opaque to the short rays) so as to protect their eyes from damage. It is obvious from these facts that treatment with rays will not benefit cataract. Indeed, there is some evidence that it is liable to cause cataract. Cataract is common in India, where excess of sunlight is found; it is true that food factors have some possible effect, but since the earliest changes are commonly found in the lower half of the lenses it is probable that this selection is the effect of light. When cataract is actually present—that is, when the lens is opaque—no form of treatment will alter the state save operation. It is said that there is a cult of sun-worshippers in India who gaze at the sun for some time each day. One of these came to me as a patient recently. This Indian gentleman assured me that for one hour daily he gazed naked-eyed at the sun. On examination it was found that he had advanced cataract in each eye and his visual acuity was greatly reduced.

COLD HANDS.

"A. M." writes: I recommend "W. G.," who suffers from cold hands (JOURNAL, November 12th, p. 905), to try the following device, which formerly, when I used a pedal or motor cycle, I found to be the only means by which I could keep my hands warm in cold weather. Wear a pair of thick woollen gloves, and over these a second pair made on the pattern of seamen's "steering gloves" (with a separate compartment only for the thumb, and all the fingers in one). I used hand-knitted over-gloves, but fur-backed gloves of this pattern are procurable, and would probably be even more effective, and certainly preferable if "W. G." drives his own car. The essential points are that both pairs must be a loose fit and the outer pair must not have separate fingers.

INCOME TAX.

Emoluments of Appointment.

"J. P. S." is a resident assistant medical officer. The appointment was advertised as carrying a salary of "£550 per annum *plus* unfurnished house . . . valued at £50 per annum." The resolution of the authority making the appointment provides for "an inclusive salary of £600, and that from this salary be

deducted £50 per annum as representing the value of the unfurnished house, etc." What should be the amount of the gross Schedule E assessment?

*** "J. P. S." rightly regards Mr. Justice Rowlatt's dicta in Cordy *v.* Gordon as the source from which the answer should be obtained. We fear that the change in the terms of the resolution has weakened his case. In the first portion of his judgement Mr. Justice Rowlatt appears to distinguish between (1) payment of a salary *plus* an emolument not convertible into money, and (2) payment of a salary on condition that part be spent in some prescribed fashion. Tennant *v.* Smith settles the former case in favour of the taxpayer, but the judge seems to have inclined to the view that in the second case the taxpayer will normally be liable on the full amount on the "salary"—"he has been paid a salary, and what he does with the salary is immaterial." One point in our correspondent's favour is that the judge laid some stress on the fact that in the case he was dealing with the sum to be paid was variable, whereas the deduction from salary which "J. P. S." suffers is constant. It is clearly a distinguishing feature, but we think that, on the whole, the odds are against "J. P. S.'s" success.

New Practice.

"Retiring" has sold his specialist practice in London under covenant not to practise his specialty in England for five years; he will reside some distance from London and may do general consulting work, and also some work for the Ministry of Pensions.

*** His income tax for 1928-29 should not take into account any results of the, then transferred, London practice; he will be starting a new practice, the income from which will, for the first year, be assessable at the amount of the fees earned in that year, less the expenses incurred in earning them. With regard to expenses incurred partly for private and partly for professional purposes, the only guide we can give is to point out that the total should be reasonably divided according to the actual ratio of use during the year. The Ministry of Pensions work will apparently be such as to justify the inclusion of the emoluments with other fees as the product of general practice. On that basis our correspondent might fairly claim to include the car mileage of the journeys to and from the Pensions Office as professional use, but his legal title to do so is not beyond doubt. If "Retiring" does not put up a plate or set aside part of his house for professional purposes there is very little, if anything, that he can deduct as the expense incurred professionally by way of rent, rates, etc.

Locumtenent's Expenses.

"W. D. M." was engaged as a locumtenent in 1926-27 and has since "settled down in practice." The inspector of taxes advised him to make one return, including locum and other earnings together, but now declines to allow him to deduct the expense of travelling about when doing locum work.

*** Strictly the "practice" earnings should be dealt with separately on the basis of the previous earnings of the predecessor, if more favourable to "W. D. M.," but in either case the expenses of travelling about on locumtenent work should be deducted in arriving at an assessment on those earnings as one unit. The inspector's view seems to be based on the assumption that they are being dealt with under Schedule E as the earnings of employment; in our opinion that is not the correct basis of assessment of locumtenent fees, and, in any case, that is not the basis which is being applied, seeing that they are being assessed under Schedule D.

LETTERS, NOTES, ETC.

Fellowship of S. Michael and All Angels.

We have received the following note from the secretaries of this benevolent organization:

"It is thought that members of the medical profession might be glad to know of a maternity home belonging to the Fellowship of S. Michael and All Angels, a society existing for rescue work among girls of the educated and professional class. The fees are very moderate. All information can be supplied on application to the secretary, 5, Bloomfield Terrace, S.W.1."

Disembowelment and Shock.

Mr. Harold Hartley, F.R.C.S. (Newcastle, Staffs), writes: Perhaps yet another quotation may be of interest. Razis, an elder of Jerusalem, to avoid capture by the troops of Nicanor, attempted hari-kiri, but through excitement "missed his stroke." He then ran and cast himself from the wall of the city, falling on his side. "And having yet breath within him, and being inflamed with passion, he rose up, and though his blood gushed out in streams and his wounds were grievous, he ran through the crowds, and standing upon a steep rock, when, as his blood was now well spent, he drew forth his bowels through the wound, and taking them in both his hands, he shook them at the crowds; and calling upon him who is Lord of the life and the spirit to restore him these again, he thus died."—*Apocrypha*, II Maccabees, xiv, 37-46.

The Cause of Vesical Calculus.

Dr. A. J. Watson (C.M.S. Hospital, Yunnanfu, China) writes under date September 20th: In the British Medical Journal just to hand of July 30th there is an article by Lieut.-Colonel R. McCarrison on the experimental prevention of stone in the bladder in rats. I thought that it was worth recording that to-day a male Chinese child of 30 months was operated upon for stone and a calculus weighing 7 grams removed by the suprapubic method. The child was still at the breast, though this was supplemented by rice and other foods. In view of the dramatic results obtained by Colonel McCarrison in preventing the formation of vesical calculi by adding milk to the diet of rats, this case, where the child had had maternal milk as its diet since birth, would suggest either that the maternal milk after the first year was very deficient in vitamins or that in the human subject the formation of calculi is not influenced either way by a diet of milk.

Toxicity of Ephedrine.

Dr. F. J. Kitt (Stockport) writes: Ephedrine, which has been so well boomed in the lay press as a specific for asthma, still has its literature to acquire; therefore, I desire to record an experience which has just befallen me. The patient, a woman of 64 years, was given twelve half-grain ephedrine tabloids, with instructions to take one when the breathing became difficult. Two nights ago she sent to say that she was having asthma again; could she take more than one tablet? I replied, "Yes." I was called again at 3.30 a.m. to find that she had taken ten of these tabloids in five hours without easing the asthma or apparently affecting her in any way.

A Disclaimer.

We have received from Dr. A. C. Magian (Manchester) the following letter, with a request for its publication:

I regret that recently an article purporting to be a personal interview with me and containing a highly sensational account of a lecture given by me to a medical society has appeared in the London press. The facts of the case are these: The wife of one of our members is also a press reporter to several daily papers. She read the circular sent to her husband, attended the meeting (she was not known by sight to me), and sent a report of my lecture to the papers for which she writes. The following morning, before I was out of bed or had seen a newspaper, someone, whom I took to be the publisher of a medical paper to whom I had sent an account of my lecture, rang me up and asked me about certain points connected with it. I answered in good faith, and it was not until midday that I discovered the error. Later I tried to explain to some reporters who called that the lecture was a private one and must be closed, but my explanations only produced more "copy." I have written to the London and Counties Medical Protection Society and to the various people concerned.

Corrigenda.

Dr. R. J. Clausen (London, W.) writes to point out that in the reports published last week at p. 879, some remarks on spinal anaesthesia were erroneously attributed to him. The only contribution Dr. Clausen made to that meeting was a minor query as to blood pressures, which was answered by the President; the two cases followed by paralysis of the rectum and incontinence were not reported by him.

Dr. Temple Grey (London, W.) writes: I am so substantially misreported on p. 877 of the Journal that I am wondering whether I might ask you, please, to note what I did say, namely—that the judicial authority under the Lunacy Act must accept responsibility for the commitment of persons alleged to be of unsound mind, and that if the magistrates who at present sit for this purpose will not accept this responsibility, magistrates must be found—say a county court judge or a medical barrister—who will. This is what I had the honour to propose at Edinburgh.

Dr. E. Rowland Fothergill has called attention to two errors in his letter on "Contributory schemes: hospital club practice," published in the Journal of November 12th (pp. 898, 899). The word "discussion," in the last sentence of the letter, should be "dissension"; the resolution to which he referred is not that printed as a footnote to his letter, but the Brighton resolution published in the Supplement of July 30th (pp. 74 and 75).

In the notice of the presentation to Dr. C. E. Stephens of a gold cigarette case on the occasion of his retirement from practice, published last week (p. 905), the initials were incorrectly printed.

Vacancies.

Notifications of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 45, 46, 47, 50, and 52 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 48 and 49.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page 203.